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An Analysis Framework of Enterprise Documents for Strategic Scenario-based Management

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ABSTRACT

This paper addresses an analysis framework of enterprise documents for strategic scenario-based management. "Strategic scenario" designs logical flow of actions for producing enterprise outcome, so it is significant to keep dominant position in the competitive market. The construction process of strategic scenario consists of seven processes as follows; Business environmental analysis, design of strategic goals, formation of strategies, description of business plans from strategies, description of achievement indices, simulation of financial aspects, and checking milestones and modification of scenarios. Such construction process is inherently professional works done by business consultants. However, recent investigation on their works indicates that several frameworks are effectively used to clarify analytical items from enormous related data. Along with such frameworks, we think it is possible to partially informationize the construction process. We describe which construction process is chosen as being systematic work-steps for applying information technology. Then we introduce our proposed framework. Finally some results from the experiment are discussed.

Keywords: strategic scenario, enterprise press release, 3C analysis, balanced scorecard

1. INTRODUCTION

Recently business decision-making under uncertain environment of target markets becomes more difficult than before [1]. When present corporate management is in excellent state, future corporate management is no longer on the elongation of it. To judge investment adequately, it is indispensable to analyze various factors, for instance, not only financial aspects but also aspects of organizational growth, customer satisfaction and so forth. On the other hand, along with the development of enterprise information systems, it becomes possible to judge business operations rapidly and adequately, for instance, sales planning by using OLAP (on line analytical processing) of data warehouse or data mining technique. Even if such business operations are succeeded, continuous growth of business is not attained without business strategy. Business strategy has become more critical to corporate management.

In order to make management along with business strategy, strategic scenario plays a significant role, which consists of logical actions for continuously producing enterprise outcome. Such construction process may extremely resort to professional skills so far, because the process involves repetitive work of various analysis, goal setting, and investigation through simulation, which are inherently human-centric work. It takes much time to construct strategic scenario only by hand of human professionals. Therefore there is a strong need to make it possible to construct strategic scenario by newly emerging information technology, which is expected to support human professionals.

While there are several possible approaches to support human professionals, we focus on document analysis-based support. Business documents such as enterprise annual reports and press releases indicate applied results of business strategy. Market-related documents such as consumer opinion collected through shops or a call center include potential needs for products or services. Therefore we think analysis on business documents is inevitable to construct strategic scenario. In this paper, we first describe some issues of business strategy design as the background of our proposed framework. Second we describe our proposed framework. Third we discuss functional requirements for realizing the framework on computers. Then we discuss our experiment.

2. BUSINESS STRATEGY DESIGN

Business strategy is usually positioned in the mid of business hierarchy shown in Figure 1. Business strategy has to reflect the upper layer of business hierarchy such as corporate mission and vision. Moreover business strategy has to regulate the lower layer of business hierarchy such as planning, management and process execution. Traditionally framework-based thinking such as core competence, cash flow management and so forth is adopted to design business strategy. However, recent uncertain business environment makes it useless in some sense. Instead scenario planning [2] is expected to be useful, which includes trail and error process without predefined management framework.
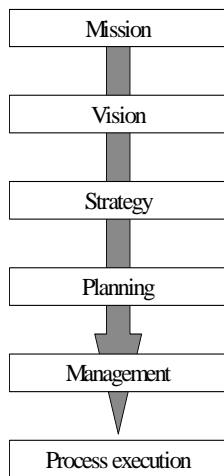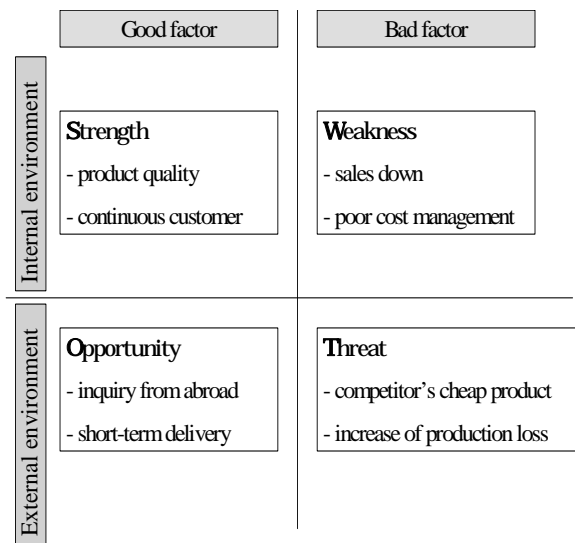
Fig.1. Business hierarchy

Fig.2. SWOT analysis framework

2. 1. Scenario planning

Scenario planning is executed through several processes as follows [3]; Business environmental analysis, design of strategic goals, formation of strategies, description of business plans from strategies, description of achievement indices, simulation of financial aspects, and checking milestones and scenario modification.

Business environmental analysis
    This analysis consists of "macro environment analysis", "business domain analysis" and "internal proce analysis". Concerning these types of analysis, analysis framework shown in Table 1 is used. For instance, 3C analysis framework generates "What are customer needs", "What are company strengthened factors" and "Who are competitors" and so forth. SWOT analysis makes it clear by using "Strength", "Weakness", "Opportunity" and "Threat" viewpoints against management resource (internal factors) and external factors as shown in Figure 2.

Table 1 Business analysis framework

Type	Macro environment	Business domain	Competitors and internal process
Framework	PEST	5 Forces 3C analysis	Value chain PPM SWOT

Design of strategic goals
    As mentioned above, strategy has to reflect corporate mission and vision. Therefore strategic goals also involve a kind of ideal concept that is derived from corporate mission and vision. Other goals are quantitative managerial indices such as market share and ROE (Return On Equity), and qualitative indices such as brand and positioning in markets.
Formation of strategies
    Strategies are categorized into three types such as "option", "basic" and "specific". Given the environmental analysis and strategic goals, "option strategies" means possible branches of basic strategies. Thus "basic strategy" is selected among "option strategies". Then "specific strategies" is a set of concrete plans concerning the "basic strategy".
Description of business plans from strategies
    Business plans are mostly used in documents such as a fiscal year sales plan or action plans for process reengineering.
Description of achievement indices
    These indices are varied from corporate level to individual, which have to be tightly linked to business plans above.
Simulation of financial aspects
    Once business plans are prepared, business parameters are derived from plans. By using business parameters, especially financially concerned, numerical simulation generates calculated results such as B/S (Balance Sheet), P/L (Profit and Loss Statement) and so forth.

Checking milestones and scenario modification
> Checking is done by using initially defined milestones. If some conditions on milestones are not achieved, scenario modification is launched.

The mentioned above is the constitution of scenario planning, which involves analysis, goal setting and investigation through simulation. Systematic approach to this scenario planning activity is not discussed sufficiently so far, we will discuss later.

2. 2. Organizational learning

When a business strategy is changed, the organization has to investigate mostly what is main cause of the strategic failure. This leads to make consensus of designing business strategy efficiently. In the field of organizational learning [4], double loop learning is a source of keeping dominant position in the competitive market. To realize such learning, structure and visualization of business strategy is assumed to be significant.

Scenario planning in the organization gives communication among members through the cyclic work that a selected basic strategy is validated and modified until achieving rational agreement.

3. PROPOSED FRAMEWORK

As mentioned in section 2, business strategy design is achieved by executing scenario planning through seven processes. Seven processes are inherently professional works done by business consultants. However, using document analysis technique can accelerate "business environmental analysis" from recent investigation on their professional works. "description of achievement indices" is recently discussed in balanced scorecard. Formerly financial aspects have been only achievement indices. However non-financial aspects such as customer satisfaction are now discussed with financial aspects.

These two processes of "business environmental analysis" and "description of achievement indices" are considered to be systematic work-steps for applying information technology. Figure 3 shows an overview of "processes related to scenario planning" and "target processes for informationizing".

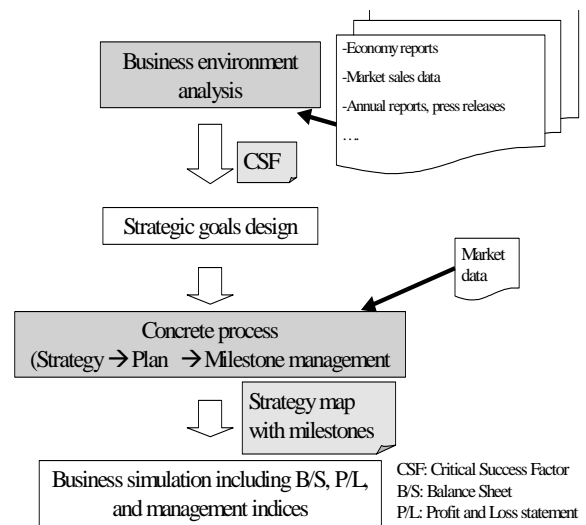## 3. 1. Functional Requirement

Fig.3 Scenario planning processes with informationizing

In the "business environmental analysis", analysis frameworks shown in Table 1 utilize several data sources, for instance, economy reports, market sales data, enterprise annual reports, press releases and so forth. By investigating keywords or summarizing statistical data from such data sources, a set of CSF (Critical Success Factor) is extracted. Information technology related to document analysis is effective against enormous data, because human professionals might fail to pick up. Among the business environmental analysis frameworks, we focus on 3C analysis [5], which are known to be useful for identifying what are the distinctive business factors of competitors. In 3C analysis, various types of data related to competitors are basis for analysis work-steps. For instance, to analyze products strategy and distinctive feature of competitive products, it is indispensable work-step to investigate enterprise documents such as annual reports and press releases. From these data sources, the followings are expected to be extracted.

Competitive analysis from product concept points of views
> This analysis focuses on extracting "What points are mostly valued in case of developing new products" and "What are the distinctive feature and the common feature of products among competitive enterprises". The word set obtained from press releases is considered to reflect the product concept.

Competitive analysis from Porter's strategy points of views
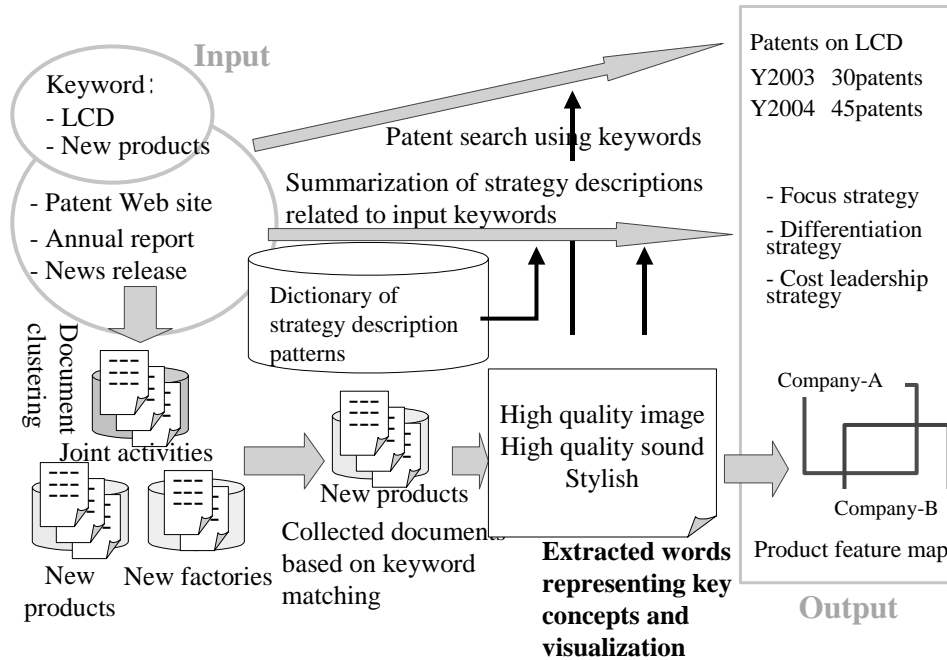> This analysis focuses on identifying either or combining "Focus strategy", "Differentiation

Fig.4 Extracting strategic analysis data from enterprise documents

strategy", and "Cost leadership strategy" using the annual reports that describe the financial information, information on new operation of the factory etc.

Competitive analysis from technology points of views

Patents related to the word set from press releases are to grasp the concentration degree of the enterprise from technical aspects to a certain product. As shown in Figure 4, this analysis historically lists them.

As description of achievement indices, we focus on balanced scorecard [6], especially from the strategy map. Balanced scorecard involves four viewpoints, one of which is "customer viewpoints". Management issues related to four viewpoints are causally connected, and achievement indices are attached to such management issues. Based on this management issues and achievement indices, visualized map, so called "strategy map", is significant to communicate in the decision-making organization. Strategy map is generalized as shown in Figure 5.

Extraction of achievement indices from customers' points of views

The achievement indices such as "What are potential customers needs in case of developing new products" are extracted from customers opinions appeared in web sites. For instance,

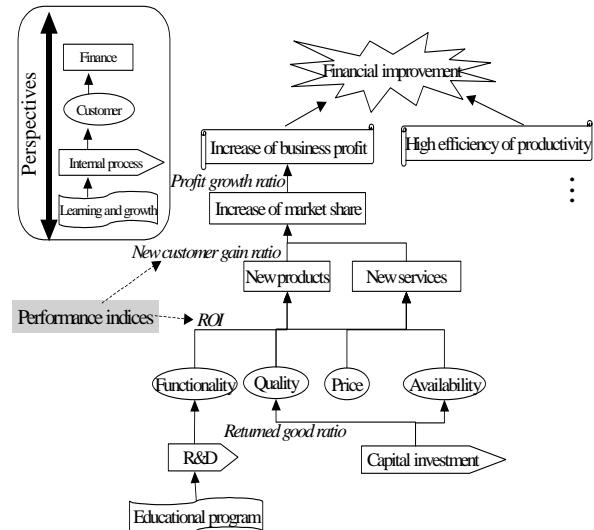Figure 6 is generated when managing achievement indices in a strategy map.

Fig.5 Generalized strategy map

3. 2. Method on extracting strategic analysis data

To realize the proposed framework on computers, we execute preliminary experiments. We here explain our one approach through an experiment on extracting strategic analysis data.
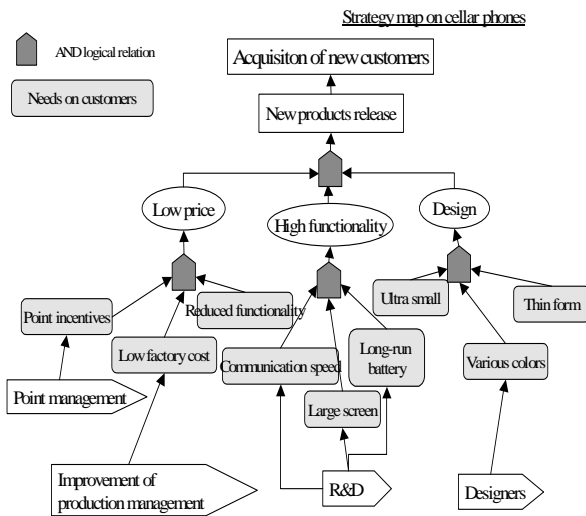
Fig.6 Management of extended strategy map

As mentioned in section 3.1, "competitive analysis from product concepts points of views" are based on extracting the word set that are considered to reflect the product concept. How to extract such a word set from press releases is cue to this analysis. First we focus on some features of press releases.

The sentences are well organized and grammatically correct.
Similar statement is used in articles on product of the same series.
The part of sentence described by such statement is considered to be the candidate of keywords describing the character of a product.

From this investigation, we set "description pattern" that indicates the expression often shown in press releases. An example of description pattern is shown in Figure 7.

The keywords described by first description pattern are "usability function" and "wide viewing angle panel" etc.
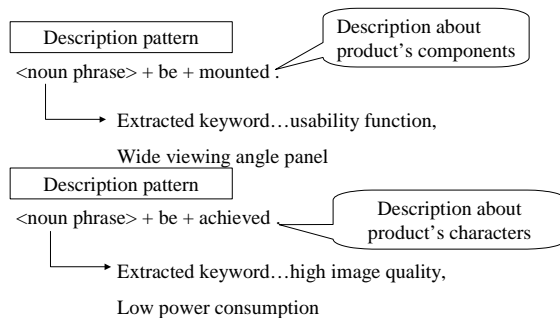

Fig.7 Examples of description pattern

The keywords described by second description pattern are "high image quality" and "low power consumption" etc. Thus, the words matched the description pattern are extracted as keywords that cannot be extracted by using the word frequency of the document. However, it is not enough to extract such keywords by only one description pattern that specified by a user. Because no keyword can be extracted from the press release if it does not include the description pattern. So, the proposed method automatically generates another description pattern that can extract keywords similar to the original description pattern. This enables to extract more keywords than only a description pattern does.

Generation of another description pattern is as follows. The keyword extracted from a description pattern is often described in other locations by another expression. In fact, it is possible that similar keywords are extracted from expressions including same keywords. So frequent expressions are searched from the sentences that include the keyword extracted from original description pattern, then considered new description patterns. Thus, newly generated description patterns are called "derivation pattern". An example of derivation patterns generated from the description patterns of Figure 7 are shown in Figure 8.
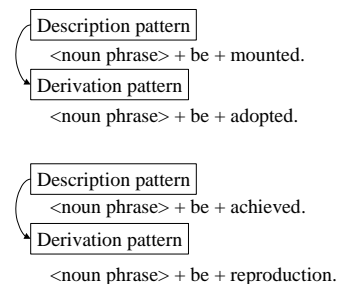

Fig.8 Examples of derivation patterns

Hereafter we use the extracted keywords as "product trend keyword".

Keyword extraction by description pattern
The sentences matched a description pattern and derivation pattern are searched from press releases by dependency parsing. In Japanese domain, we use JUMAN and KNP for dependency parsing [5], [6]. First, press releases that are converted into plain text are processed morphological analysis by JUMAN, and syntactic analysis by KNP. Next, the product trend keyword is extracted by selecting parsed sentences that have the parts matched a description pattern and derivation pattern. At that time, the segment, which directly modifies

description pattern or derivation pattern, is extracted as the product trend keyword. As shown in Figure 9, the three words in Japanese, "Digital kouhinshitsukairo" representing "Digital high quality circuit", "Sarani," representing "Additionally," and "Gashitsumen dewa" representing "about the image quality front" are extracted as keywords by description pattern such as "<noun phrase> + be + mounted". Though, in the three keywords, only "Digital kouhinshitsukairo" and " Gashitsumen dewa" are appropriate as product trend keyword. In order to extract the appropriate keyword, some of the highest frequency words are considered the product trend keyword. Because important information of product for the company is insisted repeatedly.
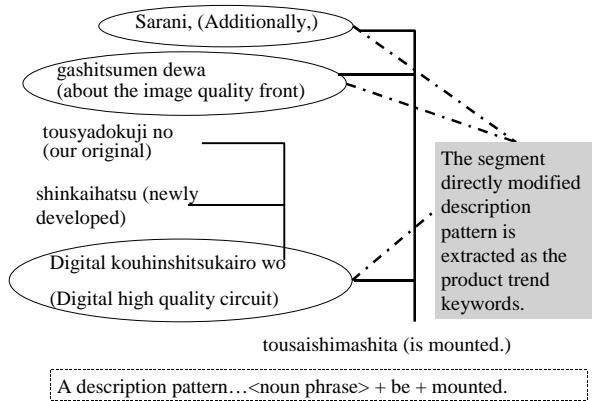

Fig.9 Keyword extraction by dependency parsing in Japanese

Generating derivation pattern

A derivation pattern is generated from the frequently expression in the sentence includes the extracted keyword. The method of generating derivation pattern is shown in Figure 10. First, the sentence including the keyword that is extracted by a description pattern is extracted from press releases. Next the expression modified by product
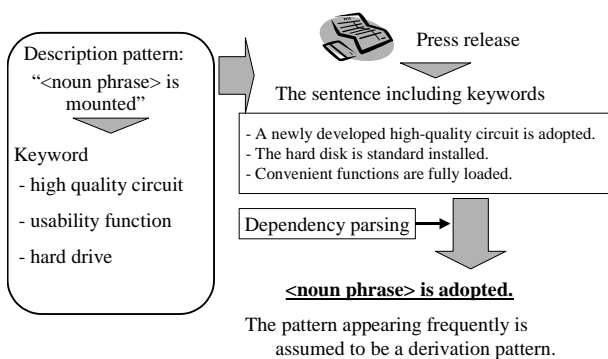

Fig.10 Derivation patterns from a description pattern

trend keyword is considered to derivation patterns by dependency parsing of the extracted sentence.

3. 3. Experimental result

The press releases of two companies about liquid crystal television are input. The press releases are found twelve at company-A and fourteen at company-B by searching with the keyword "liquid crystal television, release". The table that is constructed the keyword in frequent order is shown in Table 2. The keyword that appeared

Table 2 Extracted keywords from description

Company-A		Company-B	
Keyword	Frequency	Keyword	Frequency
High image quality	10	Easy layout	11
Image	5	Image	10
Contrast	3	Long-lived	9
Energy-saving design	2	High image quality	9
Design	2	Response	8
Operability	2	High contrast	6
Color representation	2	Wide viewing angle	6
Screen	2	High intensity & high contrast	5
Bass reproduce	2	Tone wedge	5
Reproduce	2	High-intensity	4

more than once is counted only once.

Next, The keywords extracted by a derivation pattern were compared with the one by original description pattern. First, the keyword "high image quality" was focused. And it was extracted by the description pattern "<noun phrase> + be + achieved" from the twelve press release of company-A, Next the sentences that included "high image quality" were extracted from press release and processed dependency parsing. Thereby the description modified by "high image quality" was specified. And the pattern "can + enjoy + <noun phase>", which is the most frequent description, is determined to a derivation pattern. The keyword extraction was processed by using the derivation pattern. It is shown in Table 3 the keyword extracted by the

Table 3 Difference of extracted keywords between description pattern and derivation pattern

Description pattern		Derivation pattern	
Keyword	Frequency	Keyword	Frequency
High image quality	10	Image	9
Image	5	High image quality	7
Contrast	3	abundant	6
Energy-saving design	2	High image quality	5
Design	2	Response	4
Operability	2	High contrast	3
Color representation	2	Wide viewing angle	3
Screen	2	High intensity & high contrast	3
Bass reproduce	2	Tone wedge	2
Reproduce	2	High-intensity	2

derivation pattern and by the original description pattern.

In our first experiment, the common keywords "high image quality", "vision" and "contrast (high contrast in company-B)" are extracted. This indicates that these concepts are necessary concept for the product. And other keywords indicate the characters of product of each company. The method of keyword extraction by a description pattern can extract the words that indicate concepts of a product. In the latter experiment, two high frequently keywords are identical with the keywords extracted by original description pattern. Other extracted keywords indicate the characters of the product. In other words, a derivation pattern can extract the keywords equivalent of the original description pattern.

5. CONCLUSION

In this paper, we proposed an analysis framework of enterprise documents for business strategy design. Business strategy design is considered to be human professionals work so far. To introduce the scenario planning approach to business strategy design, we set informationizing targets and clarify functional requirements. Through preliminary experiments in analysis framework and strategy milestone setting, our approach seems to be realized by document processing technique. Our ongoing work is to verify our framework through experiments.

REFERENCES

[1]C. Loebbecke, J. Wareham, "The impact of eBusiness and the information society on 'STRATEGY' and 'STRATEGIC Planning': An assessment of new concepts and challenges, J. of Information Technology and Management, vol.4, pp.165-182, 2003
[2]K. Heijden, "Scenarios", John Wiley & Sons, 1996
[3]Y. Noguchi, "Know-how, Do-how of strategic scenario (in Japanese)", PHP INTERFACE, 1999
[4]C. Argyrus, D. Schon, "Organizational learning; A theory of action perspective, Addison Wesley, 1978
[5]D A. Aaker, "Developing business strategies", Wiley, 1992
[6]R.S. Kaplan, D.P. Norton, "The balanced scorecard: Translating strategy into action", Harvard Business School Press, 1996
[7]http://www.kc.t.u-tokyo.ac.jp/nl-resource/juman.html
[8]http://www.kc.t.u-tokyo.ac.jp/nl-resource/knp.html