This paper was first presented at the European TRIZ Association meeting,
TRIZ Future 2003, November 12-14, 2003, Aachen, Germany. The figures follow the paper, in PowerPoint format.

Using TRIZ to Create Innovative Business Models and Products

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Abstract:

Most companies have many subjects around their business, and wish fast and effective solutions with new information technology. In other words, companies and their clients want innovative and impressive business solutions, to overcome severe business environment. We tried to use 40 Inventive Principles and a Contradiction matrix of 'invention methodology TRIZ', to create innovative business models and products. In this paper, we presented the methodology in 2 phases.
In the first phase, we defined essential subjects and contradictions on business, and made a „Business idea database" using TRIZ. In the situation, we defined a „business / products strategy classification" and an „information technology classification" which represented current and future business and technology. We changed mechanical concepts into business concepts and vice versa in this phase.
In the second phase, we proposed a process of conceiving innovative business models and products, using the „Business idea database" made in the first phase. Besides, we presented an example of application. At last, we evaluated this methodology, using real business models and innovative products.
As a result, it was found that TRIZ could be effective for systematic business solutions development.

Introduction

We thought that advanced business models and products could resolve contradictions in business. Recently, we found that similar solutions such as ‚distribution systems' were used in robotics and business systems. We thought that it might be possible to change business strategy or to create innovative business models and products with mechanical problem solving way. So, we decided to conceive business models / products using the 40 invention principle and the contradiction matrix with 39 parameters.
We argued about our methodology in following two steps(figure 2).
(1) We customized the contradiction matrix of TRIZ considering present business environment and information technology, and made a „Business idea database".
(2) We introduced a process of conceiving business models and products using the „Business idea database", and applied it to a concrete example.
The methodology was evaluated by applying to advanced business models and products.

Making a „Business idea database“

To change business models or strategies in a company is not small improvement but reengineering from the bottom. Competent technologies are also important to realize business ideas. So, we defined a „business / products strategy classification“, and an „information technology classification“ with catching notion of actual business(figure 3).

Definition of a „business / products strategy classification“:
From our experiences of business systems construction, we defined common strategy classification, including following three elements.
(1) Expand business / products' functions: In the case of business, it includes amalgamation, cooperation with the other company, advance to new business, etc. In the case of products, it includes addition of new functions.
(2) Concentrate business / products' functions: Narrowing down of business field or product's function according to selection and concentration, withdrawal from unprofitable operations, deletion of an unnecessary function, etc. is included.
(3) Change business process / products' structure: In the case of business, it includes business process reengineering by improvement of internal business process and cooperation with other companies such as global business deployment. In the case of products, it includes change of mechanisms to realize functions.
They are not exclusive. For example, when we want to advance to a new field, concentrate power there and reform a business process, our strategy may be a combination of (1)(2)(3).

Definition of an „information technology classification“:
Information technologies have had big influences on the latest business. The following three elements were selected in consideration of what kind of subject has so far been solved by information technology.
(1) Reduce time or space: Technologies of network, throughput of hardware, and technologies of broadcast are included.
(2) Change media of information: Technologies of multimedia are included.
(3) Distribute or integrate information systems: Technologies to integrate information systems.

Making a „Business idea database“:
In order to conceive business models or products, we made a „Business idea database” according to a next process(figure 4).
(1) For each business / products strategy, contradictions generated by essential subjects were taken out. At that time, the contradiction matrix was applied to them, the principles of invention were taken out.
(2) On the other hand, the principles of invention were translated to the words of business. We called them ‚patterns of business idea'.
(3) We applied patterns of business idea to taken out principles of invention and made a „Business idea database“.

For each business / products strategy, we extracted expected improving points and degrading points(figure 5). For ‚Expand business / products' functions', we took out two

improving points ‚Correspond strongly to a pressure from outside' and ‚Promote business strongly towards outside'. At the same time, we took out two degrading points ‚An organization becomes big' and ‚Useless tasks increase'. Similarly, for ‚Concentrate business / products' functions', we took out three improving points and two degrading points, and for ‚Change business process / products' structure' we took out six improving points and two degrading points.
Next, we chose parameters of TRIZ corresponding to these points. For example, for ‚Correspond strongly to a pressure from outside' we chose ‚Tension, Pressure', and for ‚An organization becomes big' we chose ‚Volume of moving object'.

Figure 6 shows part of principles of invention taken out for every combination of improvement parameters and degradation parameters. We wanted to connect them with the idea of business. Mechanical words used in TRIZ were translated to the business words by the following methods.

In order to apply principles of invention taken out from the contradiction matrix to business models or products, we translated them into words of business. We called the result ‚patterns of business idea'. Each pattern corresponds to each principle of invention. Moreover, we added information technology classification elements that could be used to realize each pattern. For example, a principle of invention ‚Universality' was translated to ‚Abstract, standardize and reuse functions' and as realization technology ‚Distribution and integration of information systems' was selected.
Part of obtained patterns of business idea is shown in figure 7. Although these are primitive interpretation of principles of invention, they can be changed with social environment and technical trend.

We applied patterns of business idea to principles of invention, reconstructed and made „Business idea database" (figure 8). We can conceive new business models or products using this database. At that time, it is necessary to consider strategies and environmental conditions of each company.

Process of conceiving business models or products

In this phase, we will show a process that makes advanced business models or products by potential needs of clients using a „Business idea database" (figure 9).

Overview of the process:
The first step of the process is gathering information about business strategies of a company and customers' environment. Information about a company's core technology and allied products is also needed.
In the second step, business ideas are taken out from the „Business idea database", and several candidates of business models or products are created from them.
In the third step, these candidates are evaluated, and the best one is selected. Finally, appeal points of the selected business model or product is clarified, going back to original subjects, solutions, and improving points.

How to evaluate business models or products:
When business models or products are conceived, environment that surrounds a company, actual condition of business and more detailed request of market and customers are investigated. We need to evaluate whether the company can capture value from conceived business models or products. We introduced evaluation criteria that combine five forces (Rivalry, New entrants, Substitute products, Customer power, Supplier power) that influence on value capturing, and requirements for sustainable advantages (Scarce, Hard to transfer, Hard to imitate, Hard to identify, Durable, Hard to substitute) /LIT 1/(Figure 10).

Example of application

We tried to apply the process to a new business model creation in a virtual company that holds following subjects (figure 11).
[‚Company X' is developing and selling products for consumers and companies. It wants to make a new business model like Internet-commerce, for the increase in sales, and improvement in profit. In this case, what kind of business model for what kind of products should be made?]

At first, we considered a rough strategy, then, chose business / products strategy elements and expected improving points. These were selected strategy elements.
(1) By expanding business, it promotes business strongly towards outside.
(2) By changing a business process, it accelerates business.
(3) By changing a business process, it simplifies structure of works and reduces useless works and costs.
On the other hand, we selected core technologies could be used and corresponding technology classification elements.
(1) Internet: Reduction of time and space
(2) Accumulation and distribution of digital data such as image and sound: Medium change of information

We took out business ideas from the „Business idea database" using strategy classification elements, expected improving points and technology classification elements. Figure 12 shows business ideas for a strategy ‚By expanding business, it promotes business strongly toward outside'.
By arranging taken out business ideas, we selected next 6 ideas.
(1) Change a form of products, an accumulation method and a dispatching method by a new medium.
(2) Add new products and services to conventional products / services and provide them in a new viewpoint.
(3) Change a form of a product or a service into a form that has an influence on customers' consciousness.
(4) Simplify a structure of circulation and sell products directly.
(5) Although channels of information are many, windows to receive from customers are unified.

(6) Set up quality levels of products and services from a customer's viewpoint, promise them to a customer.
They were taken out almost automatically from the „Business idea database“.
Finally, environmental conditions and information technologies were investigated, and several business models were conceived using them.

We introduced one of them as an example (figure 13).
[Internet sales of digital pictures with sound: ‚Company X' ties up with prominent ‚Y art museum' and sell digitized pictures on the Internet. Each picture has music suitable for its image, and customers can listen to them when they look at sample pictures. Furthermore, X develops new audiovisual equipment for seeing digital pictures with sound with another maker, and puts on the market at the same time. X installs a customers' window and promises customers' quality levels beforehand.]

According to the evaluation criteria, we evaluated the degree of the value capturing by this business model for ‚Company X' (figure 14). Considering the present environment of ‚Company X', by adopting this business model, it would acquire big value certainly. Some elements such as know-how of digital contents dealings including pictures' copyright and relations between ‚Company X', ‚Y art museum', and an audiovisual equipment maker, influence the success or failure of this business model.

Evaluation of the methodology

We would like to estimate whether this methodology might be able to conceive advanced business models or products. We evaluated the methodology with a following process(figure 15).
(1) We picked up certain business models and products, and took out essential subjects, expected improving points and technologies that can be used.
(2) Using taken out subjects, expected improving points and technologies, we extracted business idea group from the „Business idea database“.
(3) We compared the extracted business idea group with the currently used idea group of target business models or products. We evaluated whether this methodology can conceive more various ideas than current ideas.

For evaluation, we selected two business models from patent journals and two latest idea products. Outlines of them are shown in figure 16,17,18.
Figure 19,20 show a part of business ideas taken out by this methodology, comparing with ideas of present business models and products. Round marks show ideas closely related with target business models / products. Double round marks show new ideas that are not included in current ones.
For example, in ETC (electronic toll collection system), ‚Change a service or a product into a form that has an influence on users' consciousness', ‚Add new information to conventional information and analyze it in a new viewpoint', ‚Improve works in a customer's place and set up a quality level', may be used to conceive higher value added business models or products.

Although evaluation with four business models or products is not sufficient, we can grasp that the methodology is quite useful for conceiving new ideas.

Conclusion

We made a „Business idea database“ using the 40 inventive principles and the contradiction matrix and a method of conceiving new business models or products using it. We evaluated the methodology and recognized following points (figure 21).
(1) Using this methodology, we may make more various ideas compared with conventional ways of thinking.
(2) This methodology has a possibility that extend a business opportunity, by using together with the existing requirements analysis techniques, marketing techniques, and business planners' sense.

There is a subject that should be solved from now on. The „Business idea database“ made in this paper is an example based on experiences of authors, and may be changed according to social environment and technical trends. We need to evaluate a „Business idea database“ and patterns of business ideas that are origin of it, and make an improvement mechanism.

Business models / products that ‚betray' customers' expectation in a good meaning, may impress them, and raise purchase volition. They should be connected with the solution of subjects that customers and companies might give up or might not notice.

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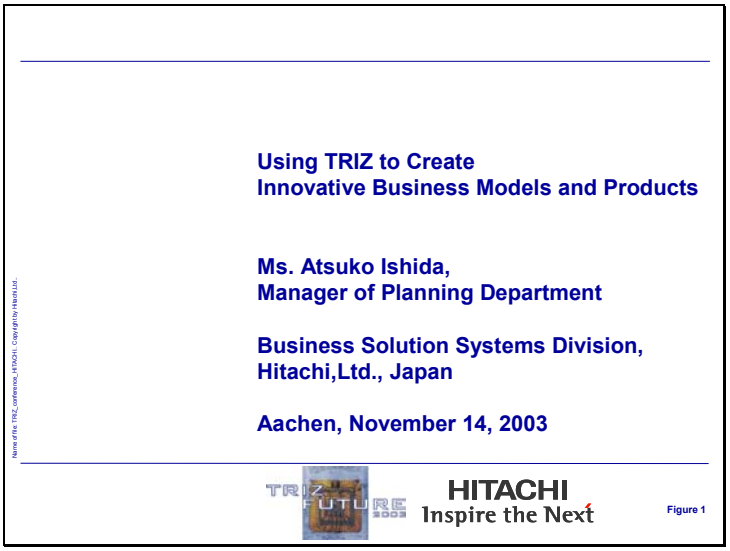

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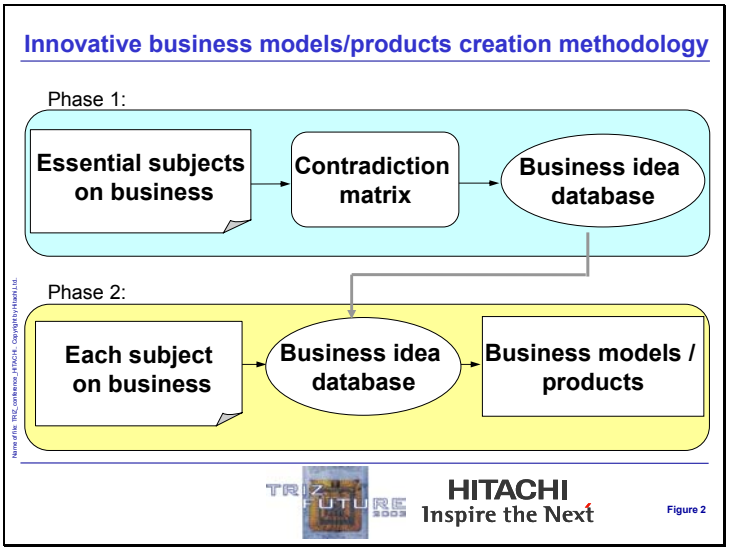

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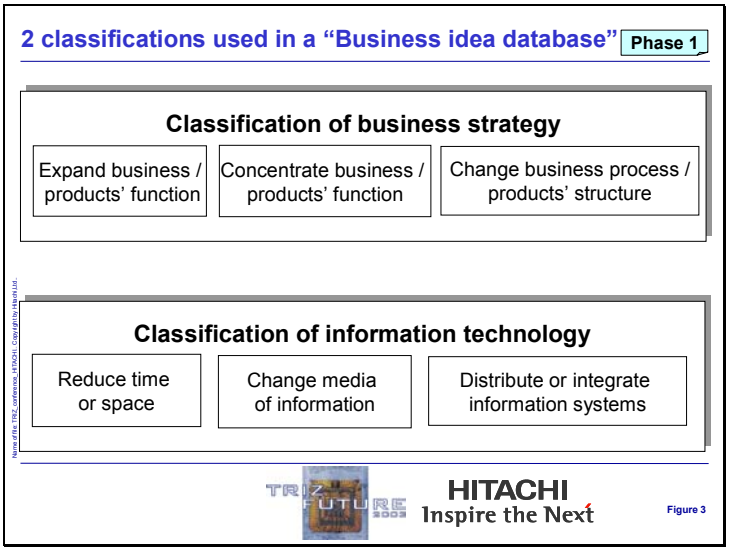

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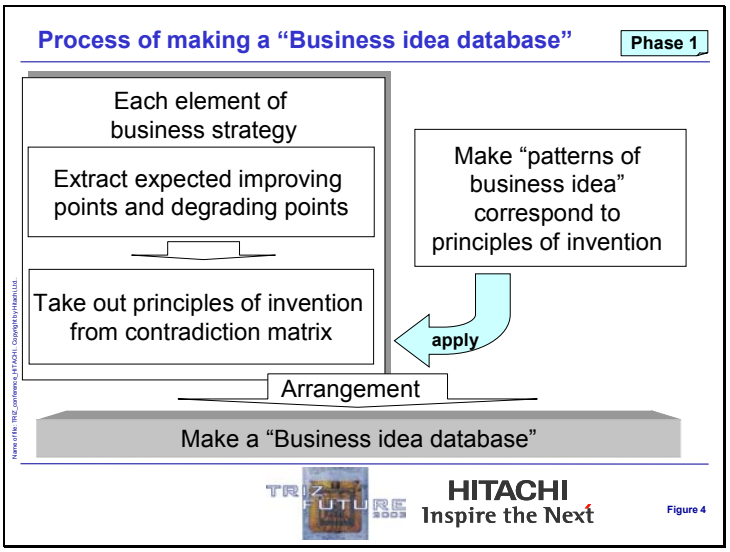

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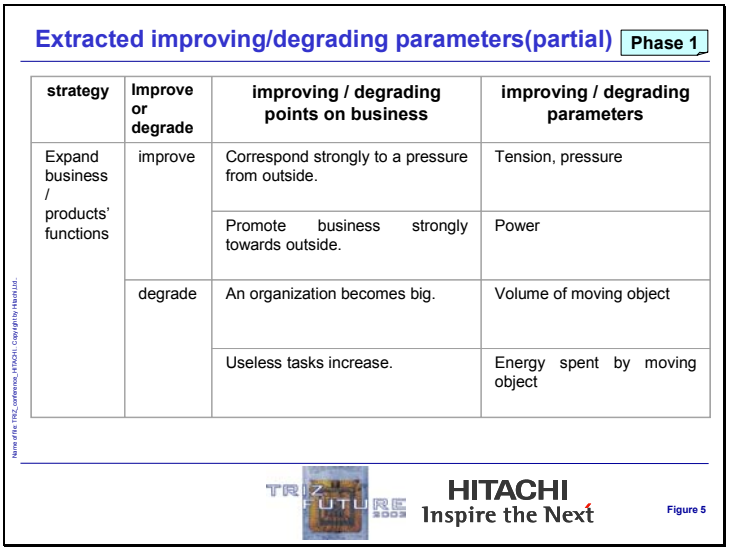

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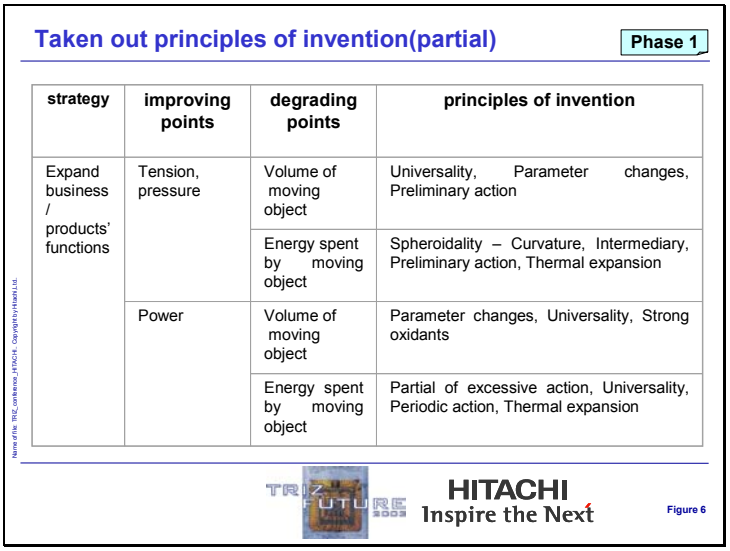

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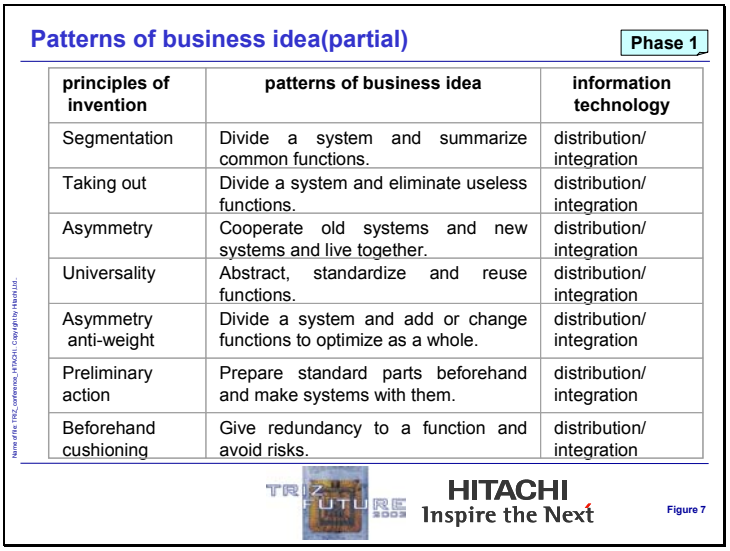

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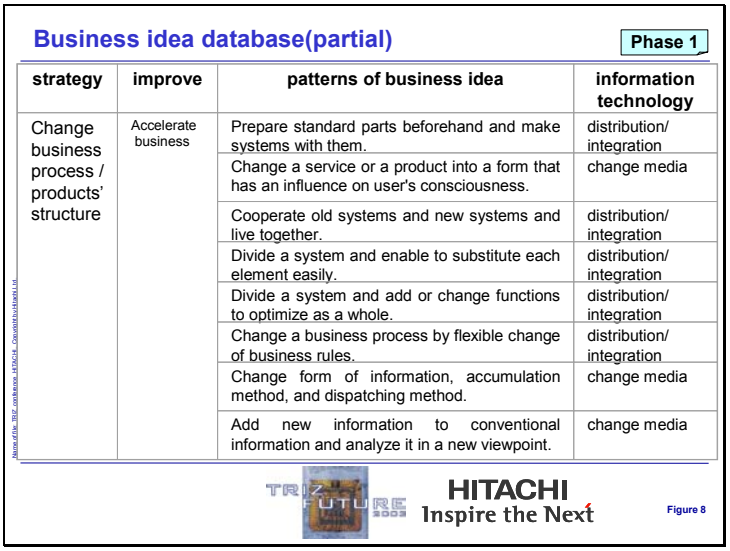

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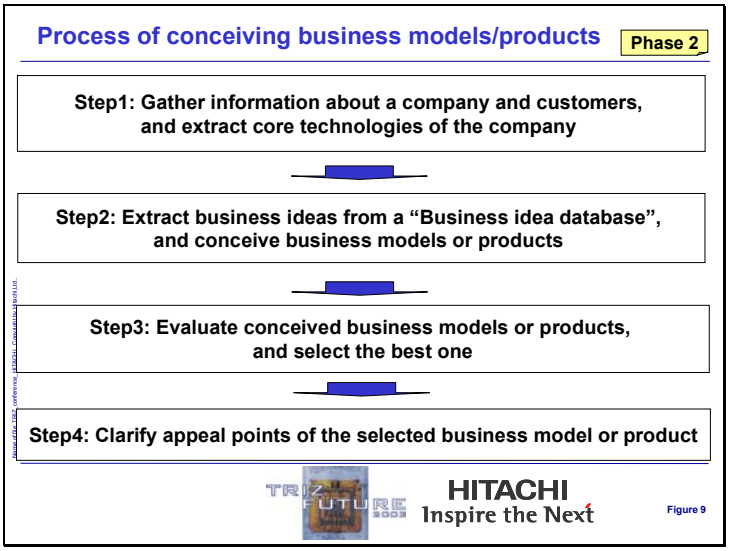

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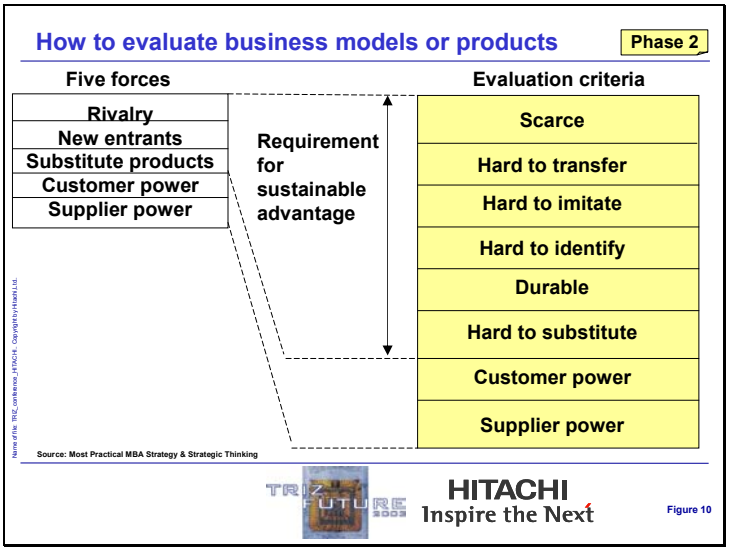

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Example of application: subjects definition

Phase 2

Company 'X' is developing and selling products for consumers and companies. It wants to make a new business model like internet-commerce, for increase in sales, and improvement in profit. In this case, what kind of business model for what kind of products should be made?

Essential subjects

By **expanding business**, it **promotes business strongly** towards outside.

By **changing a business process**, it **accelerates business**.

By **changing a business process**, it **simplifies structure of works** and reduces useless works and costs.

Core technologies | Internet | Data accumulation / distribution

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Figure 11

Slide 12

Taken out Business ideas (partial)

Phase 2

"By expanding business, it promotes business strongly toward outside"

Patterns of business idea	Technology
Change form of information, accumulation method, and dispatching method.	**change media**
Add new information to conventional information and analyze it in new viewpoints.	**change media**
Dispatch information periodically and change interval.	**reduce time/space**
Make structure of broader-based propagation of information.	**reduce time/space change media**

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Figure 12

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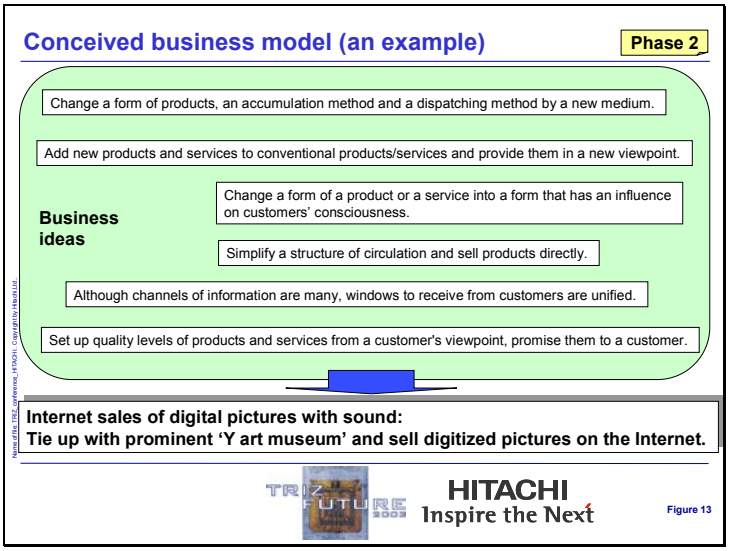

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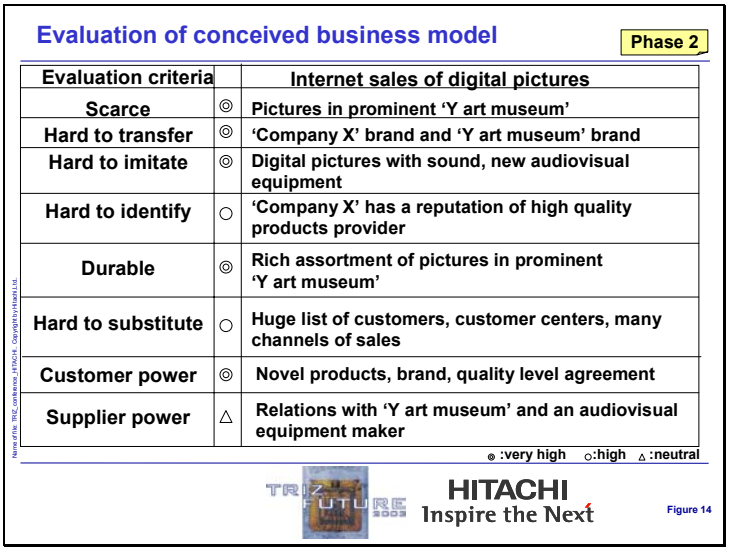

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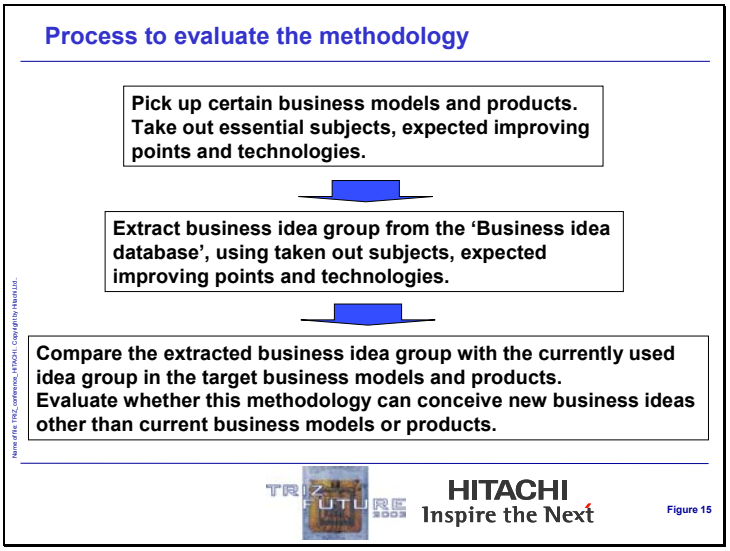

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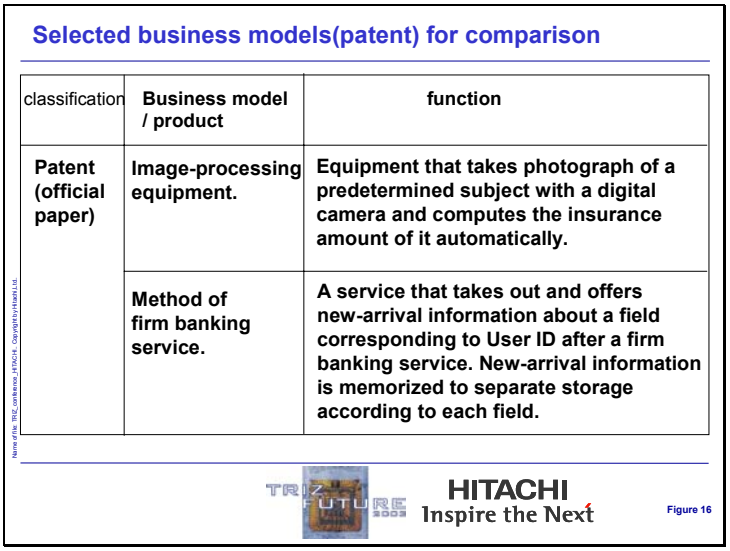

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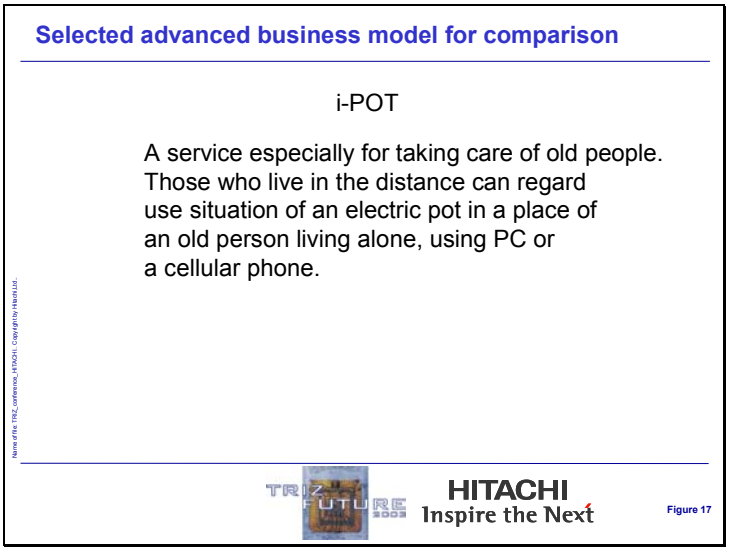

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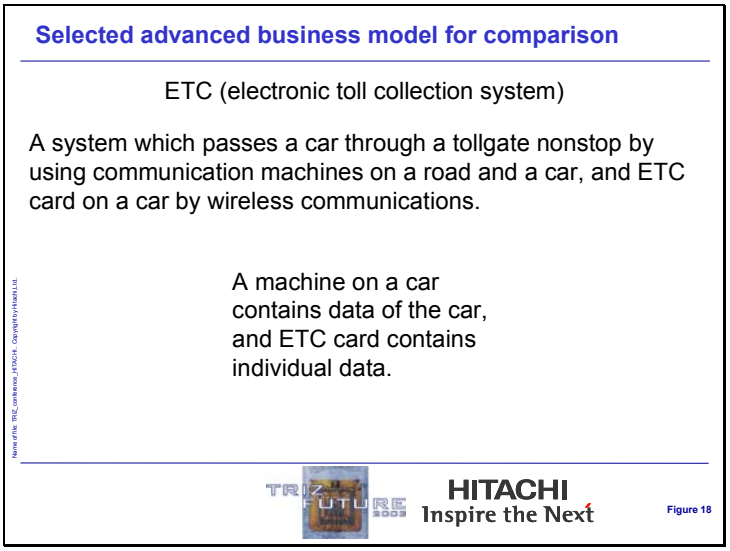

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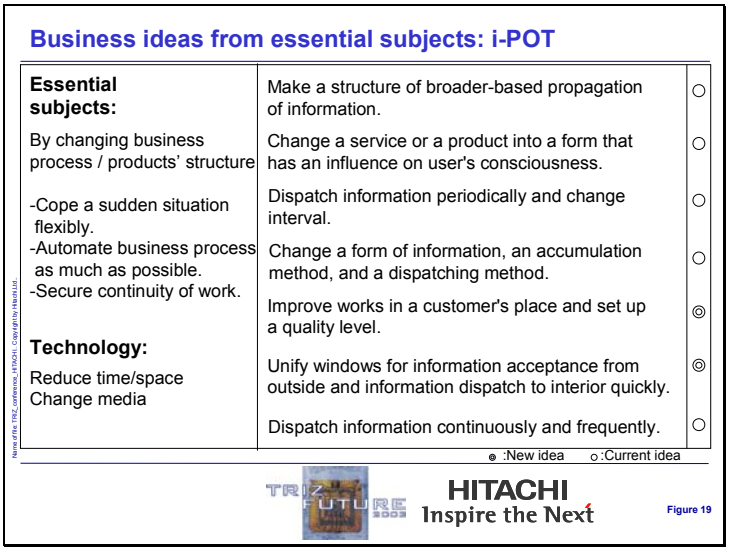

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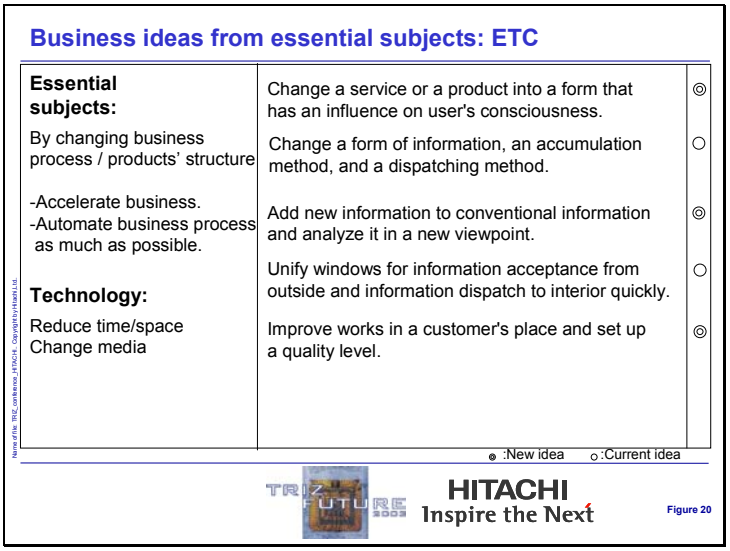

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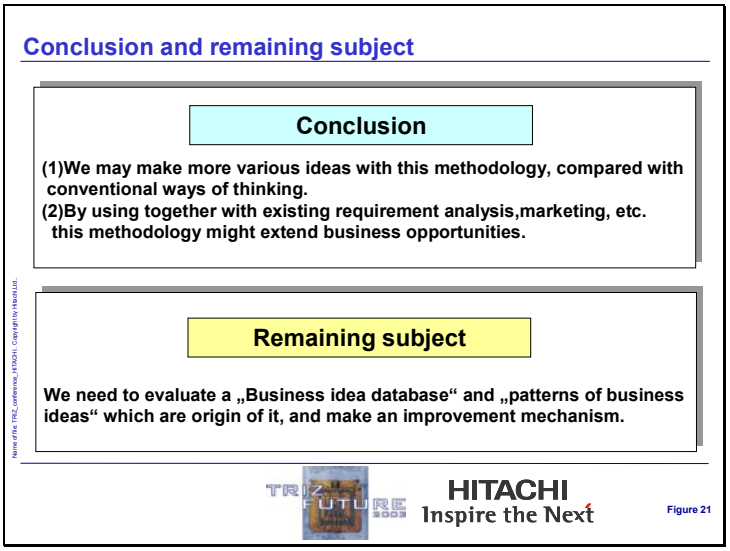

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1999 -	Department Manager of Planning Department at ‘Business Solution Systems Division, Hitachi, Ltd.’ : New business solutions development