Development of Experience-oriented Approach to Information and Telecommunication Systems Business

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OVERVIEW: The importance of experience to the creation of new corporate value is coming to be widely recognized, a trend that is exemplified by Apple Inc., an iconic company that has delivered many innovative products. In 2009, Hitachi systematized the experience-oriented approach of the super-upper process methodology for aiming at creating new values in system development. The enhancement and accumulation of the know-how of this approach have been achieved through application and deployment to business process re-engineering in particular for our financial, manufacturing, and retailing customers.

INTRODUCTION

AS corporate activities are becoming more global, the responsibility of information systems is increasing respectfully. In recent years, awareness of the use of the super-upper process such as in business analysis and stakeholder management has increased substantially. In July 2009, Hitachi announced its original experience-oriented approach as a requirement development technique that can enhance the experience of system users and assist with building a consensus among the stakeholders in the super-upper process of system development. This experience-oriented approach has been implemented primarily in the finance industry, and also in the manufacturing and power sectors. Our recent effort has been to expand the application of the approach widely, such as collaborating with application lifecycle management or constructing urban planning for Hitachi's smart city business.

This article describes the specific techniques used by the experience-oriented approach, how solutions are implemented in practice, and how the approach is applied to new solution services through integration with system operation.

USE OF EXPERIENCE-ORIENTED APPROACH IN SUPER-UPPER PROCESS

Our original experience-oriented approach is a framework for building consensus over the requirements that consider customer experience extensively with a common understanding of the fundamental subjects among all stakeholders in the super-upper process of any system development[(1)]. The super-upper process includes conceptualizing the basic system structure, formulating the system plan, and processing requirements definitions. Our approach consists of three steps: "the excitement of the comprehension," "the excitement of the expectation," and "the excitement of the acceptance." The purpose of these steps is to achieve consensus through various visualizations and interactive communication among the stakeholders (see Fig. 1). In addition to involving

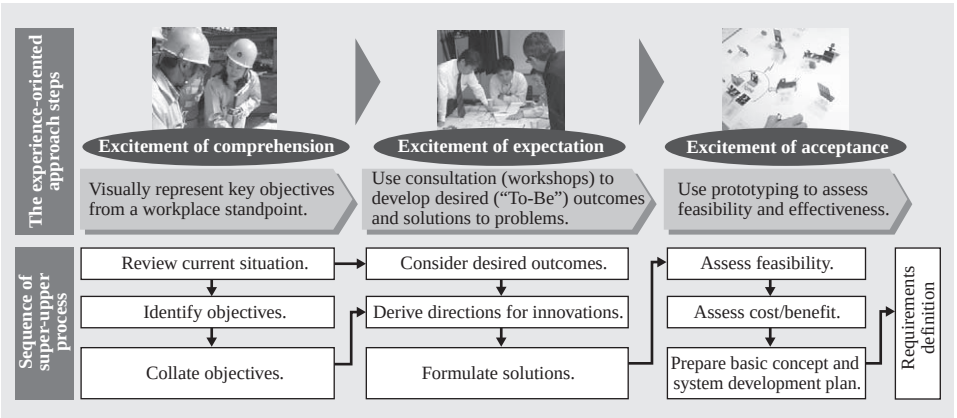

Fig. 1—Features of the Experience-oriented Approach. The experience-oriented approach utilizes experience design techniques to identify objectives and provide a visual overview of the system during the super-upper processes of system development.

the system engineers and business consultants, having Hitachi designers participate in the super-upper process is a special feature of our original experience-oriented approach. By utilizing the experience design techniques established by Hitachi through its own design development of its own products, and by visualizing the key objectives, the unexpressed demands, and the new system images, the development of the system requirement specifications that are with the higher experience values become possible.

Excitement of Comprehension: Visualization of Fundamental Objectives from On-site Operations

In this step, to share and to understand the objectives among all the stakeholders from the management, marketing, and system departments, is undertaken based on focusing on the on-site operations where the system has actually been used. The first stage is to collect the operational manual, the structure of the system, and a list of the existing operational issues that were investigated by the customers. Based on this information, an experience table[(2)] is applied to structure an overview chart of the current operational flow. While plotting the existing operational issues, re-investigations are conducted for specific targeted issues and overlooked areas. The techniques applied for these re-investigations here consist of a combination of several data analyses such as the system log, with an ethnographic research focus. The researchers conduct observations and interviews at the on-site operations to capture the reality. The workshops are then held to share the investigation results with the stakeholders, for structuring an objectives map that shows the relationships, and to prioritize the objectives (see Fig. 2).

Excitement of Expectation: Development of Future Operational Image ("To-Be") and Solutions

This step utilizes the shared and understood objectives in the "excitement of comprehension" step in order to develop a "To-Be" operation image that can enhance the experiences of the customers and all stakeholders who are involved in the system. The development is conducted by visualizing "where" and "how" to optimize "the overall structure of operation and service" for improving the experience value. The followings are the two perspectives for conducting this development.

(1) The "stories" of all the stakeholders in the operations

(2) The "structures" that produce the deliverables

The example of developing the objectives by stories is shown in Fig. 3. Regarding purchasing of the products in the shop, the on-site voice of "too many products to understand" and the "hospitability" for "wanting to fulfill the expectations" are illustrated as stories.

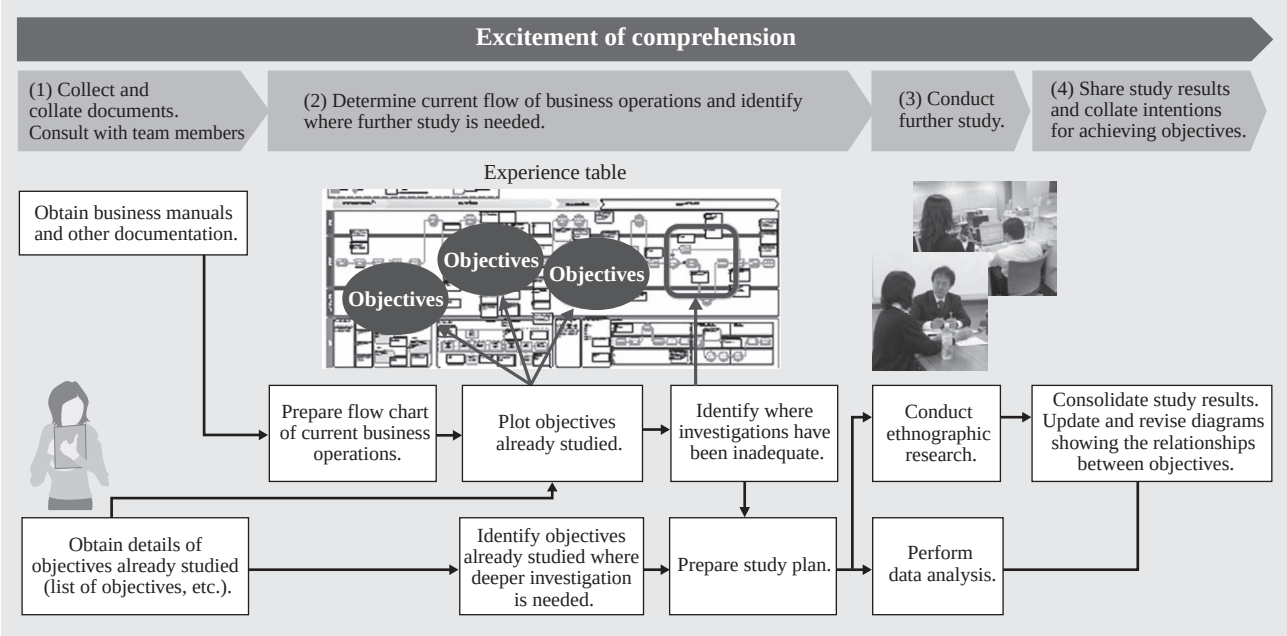

Fig. 2—Processes and Tasks for Achieving "Excitement of Comprehension."
This step uses experience tables and ethnographic research to produce a visualization of the current situation in the workplace, including its genuine objectives and needs, from the perspective of the overall business.

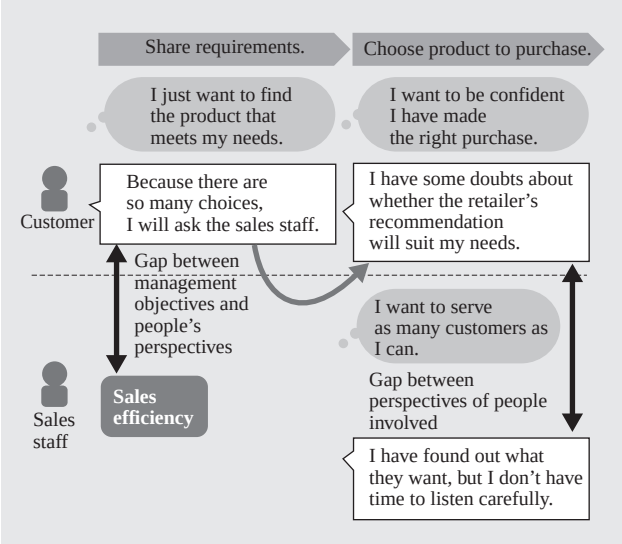

Fig. 3—Use of Stories to Identify Objectives.
The gaps between management objectives and people's perspectives are used to identify objectives.

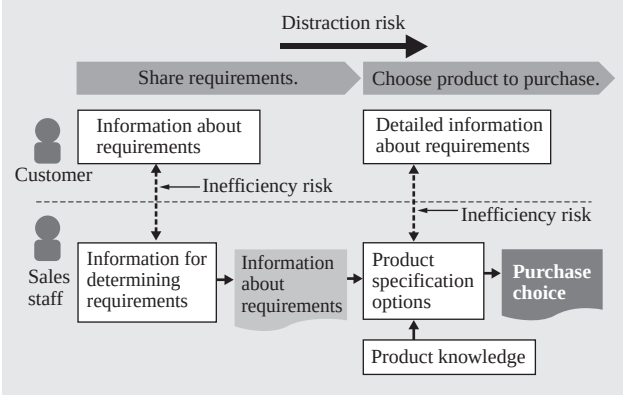

Fig. 4—Identifying Objectives from Structural Perspective.
Objectives are identified from considerations such as the reasons for performing processes or inefficiencies resulting from too much or not enough information.

The bottlenecks can be identified as the following gaps.
(1) Gap between the "management objectives" and the "voices": the objective is to achieve "sales efficiency," but the customers "seek assistance from the shop staff."
(2) Gap of perspectives among stakeholders: the shop staff have "certain responsibilities to fulfill," but "the customer" is coming with "uncertain and anxious feelings."

On the other hand, the example of developing the objectives from the structures that produce the "deliverables" is shown in Fig. 4 with the same format. The product relation-based process (PReP) model is utilized here to visualize the relationships of information. The PReP model is a descriptive model that describes the actual activities in terms of the deliverables.

From this, the inappropriate factors appear from the following perspectives.
(1) Rationality for the processes of achieving the final deliverables
(2) Risks and inefficiency from excessive or lack of information

The next step is to determine "how to change," which means to establish the relationships for the information and the optimized processes with a perspective of structure. One example might be that "the overall efficiency could be improved if the customers could specify the potential purchasing of products by themselves in the shop."

As per the perspective of story, the new story is designed to satisfy both the expectations of stakeholders and the management objectives, as shown in Fig. 5. For example, "the overall performance would be enhanced if customers were given the tools to choose products for themselves in the shop."

An optimization from overviewing the whole operation and service is achieved by repeated interactive communications and transparent information sharing among the stakeholders in the project. To achieve this, the experience-oriented approach utilized both an original tool called an experience table for co-creating the stories and a PReP model for describing the structures. The stories are mainly used in interactive communications with management and business departments, whereas the structures are used for the communicating information technology system departments of the clients interactively.

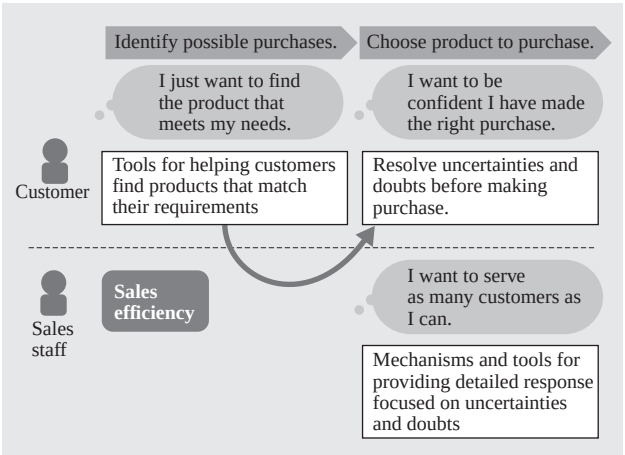

Fig. 5—Use of Stories to Derive Possible Solutions.
A new story is created from the ways and means of satisfying both stakeholders' expectations and management objectives.

Through the repeated visualization and interactive communication, creative solutions are developed by triggering the conversion of implicit and explicit knowledge of projects.

Excitement of Acceptance: Verification of Effectiveness and Feasibility of Solutions

In this step, the solutions reviewed in the step of the excitement of expectation are verified from the perspective of finding the possibilities of its feasibility and examining its effectiveness. The purpose of this process is to develop a project plan that is agreed and accepted by all stakeholders in the project. The experience-oriented approach is capable of investigating the return on investment and the feasibility of each solution to focus on the predictable significant changes in the operations by re-evaluating the operation process and introducing the new IT tool. The actual procedural steps are listed below (see Fig. 6).

(1) Selection of operations for validating feasibility and effectiveness

The particular operations that are important for conducting the dramatic changes and actualizing experience value are selected. The future operation (To-Be) that is generated and shared by the experience table and the PReP model in the step of excitement of expectation are compared with the current structure (As-Is) that is built in the step of excitement of comprehension.

(2) Refinement of the operation and confirmation of acceptivity by action model

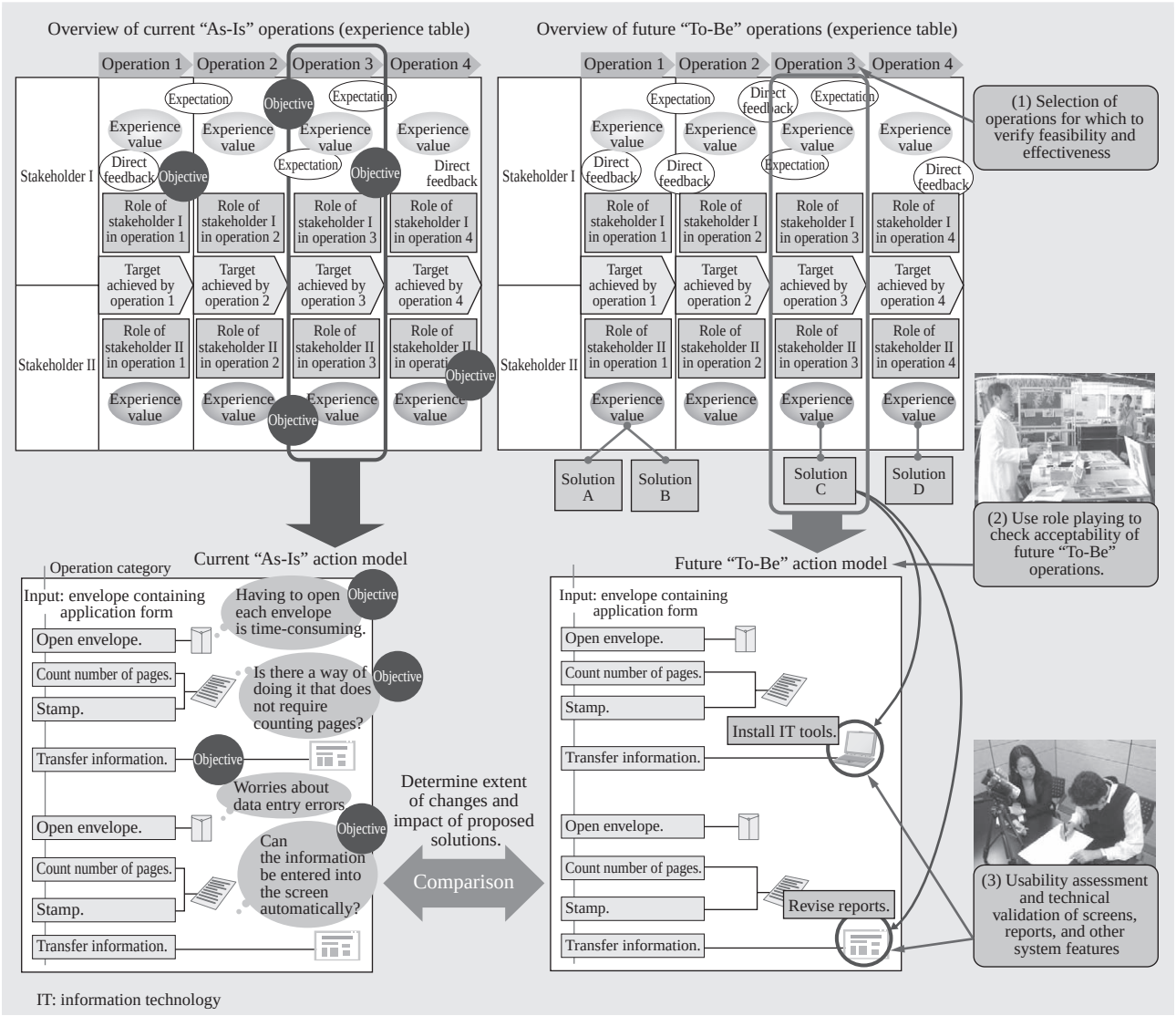

Fig. 6—Role of Prototyping Methods in "Excitement of Acceptance" Step.
Various prototyping methods are used to compare the current "As-Is" and future "To-Be" operations at the level of specific action models and assess what impacts and benefits the proposed solutions will have on operations.

Regarding the selected future operation, the action model is applied to define the details of the operation (To-Be) manual. Also, role playing activities for the future (To-Be) operation take place in the workshop for all stakeholders in the operation. The purpose of this process is to confirm the feasibility and the effectiveness of the future operation from the perspectives of the on-site operation including the gaps with the current (As-Is) operation, the advantage, and the disadvantages.

(3) Usability evaluation and technology validation of application displays and documents

Usability evaluation is carried out using simple prototyping methods so that the acceptivity of on-site operation and the more realistic effectiveness of return of investment can be verified and captured. This process is conducted to implement the new information technology, develop the application, and review the documentation procedure for actualizing the future operation (To-Be) as the solution.

APPLICATION PATTERN OF EXPERIENCE-ORIENTED APPROACH BY INDUSTRY

The experience-oriented approach was implemented in more than 30 projects between 2009 and 2010, primarily in the finance industry, and also in the sectors of manufacturing, logistics, and power. Currently, there are four application patterns depending on the industry.

(1) Super-upper process of system development that supports the sales process

In a sales process, the purchasing process of the consumer (end-user) is re-captured as the "experience of purchasing." The ideal purchasing process is redefined as the targeting sale process. This is important for examining the effectiveness from the customer's perspective. Recently, transformation of the sales process by utilizing tablets and smartphones has been popular. However, for this type of new technology implementation, consideration of acceptance and proficiency of the tool in the on-site sales process is essential. Applying the prototyping method in the excitement of acceptance step of the experience-oriented approach is effective for validating the technology implementation.

(2) Super-upper process of system development for the operation of customer channels

An overall optimized development procedure that overcomes the organizational barrier is crucial for achieving the enhancement of customer satisfaction by operating multiple customer channels thoroughly, including the call center, the website, and the store. There are two types of development that are effective. One is the visualization of operations fully from the end-user's perspective by utilizing the experience table. Another is to research the solution and to share the objectives by conducting workshops that involve all the related departments.

(3) Super-upper process of system development that supports the on-site operation

Today, even with widely spread IT systems, on-site operation based on know-how and implicit knowledge that are accumulated from long-term operational experience, such as in equipment maintenance, can be found commonly. Along with a decrease in the number of experienced talent, the difficulty of maintaining operation quality and efficiency is increasing. The ethnographic research that is focused in "the excitement of comprehensive" of the experience-oriented approach is capable of converting the implicit knowledge of an organization to explicit knowledge by visualizing "unconscious know-how" that was cultivated in the on-site operations. This has become not only the essential requirement for improving the system, but also an element to be applied increasingly in human resources development.

(4) Application to enhance BA process

Business analysis (BA) is a series of activities that are carried out for bringing values to organizations and solutions to business issues. The BA process at a corporation must sufficiently reflect the corporate culture, which includes the decision-making process. The elements here can also be referred as the elements that are "not suitable for formal and uniform standardization." The experience-oriented approach is not only capable of systematizing a specific approach based on promoting the consensus development and creativity advancement, but also of allowing a flexible combination to be utilized for different corporate cultures and each individual project. For this reason, we did not develop any new standard or process for improving the BA process. We believe that an approach of "continuous improvement" is effective. The Business Analysis Body of Knowledge (BABOK)* and the experience-oriented approach use a phased implementation within a necessary range for responding to different corporate cultures based on the existing standards and processes. Currently, this is being evaluated with customers.

* BABOK and Business Analysis Body of Knowledge are registered trademarks owned by International Institute of Business Analysis, an international non-profit organization headquartered in Canada. It provides systems for dealing with the knowledge required in BA processes.

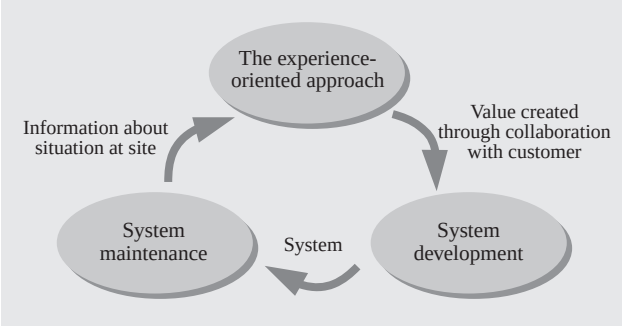

Fig. 7—Using the Experience-oriented Approach with Services. Value created through collaboration with customers is achieved by working through the experience-oriented approach, system development, and system maintenance lifecycle.

COLLABORATION WITH SERVICE BUSINESS

Although the experience-oriented approach is for the super-upper process of system development, we are conducting research that collaborates with system maintenance and services in the phase of development and implementation for delivering a systemization that will support the collaboration with the customers and not spoil the collaboration results (see Fig. 7).

There are two key issues that need to be considered when collaborating with the service business and the experience-oriented approach (see Fig. 8).

The first issue is that we need to build two processes for completing the system life cycle. One is for extracting the objectives of the current operation (As-Is) from the collected maintenance data. Another is for defining the specifications from the ideal future operation (To-Be) for the system development. However, constructing To-Be from As-Is can be achieved by co-creating with clients through the experience-oriented approach.

The second issue concerns whether the information is abstract or concrete. The information involved in the operation of maintenance or system development is specific and inclusive due to its direct connection to the system. However, in the experience-oriented approach, the development process is carried out with customers in a way that allows an easy intuitive understanding rather than an inclusive comprehension. This includes ignoring issues that are not important for creating value. Overcoming this gap is a key issue for this collaboration.

Taking account of these issues, Hitachi is working on utilizing the experience-oriented approach in the service of system maintenance and development.

Collaborating with System Maintenance

Hitachi offers an application lifecycle management (ALCM) service that provides total maintenance for

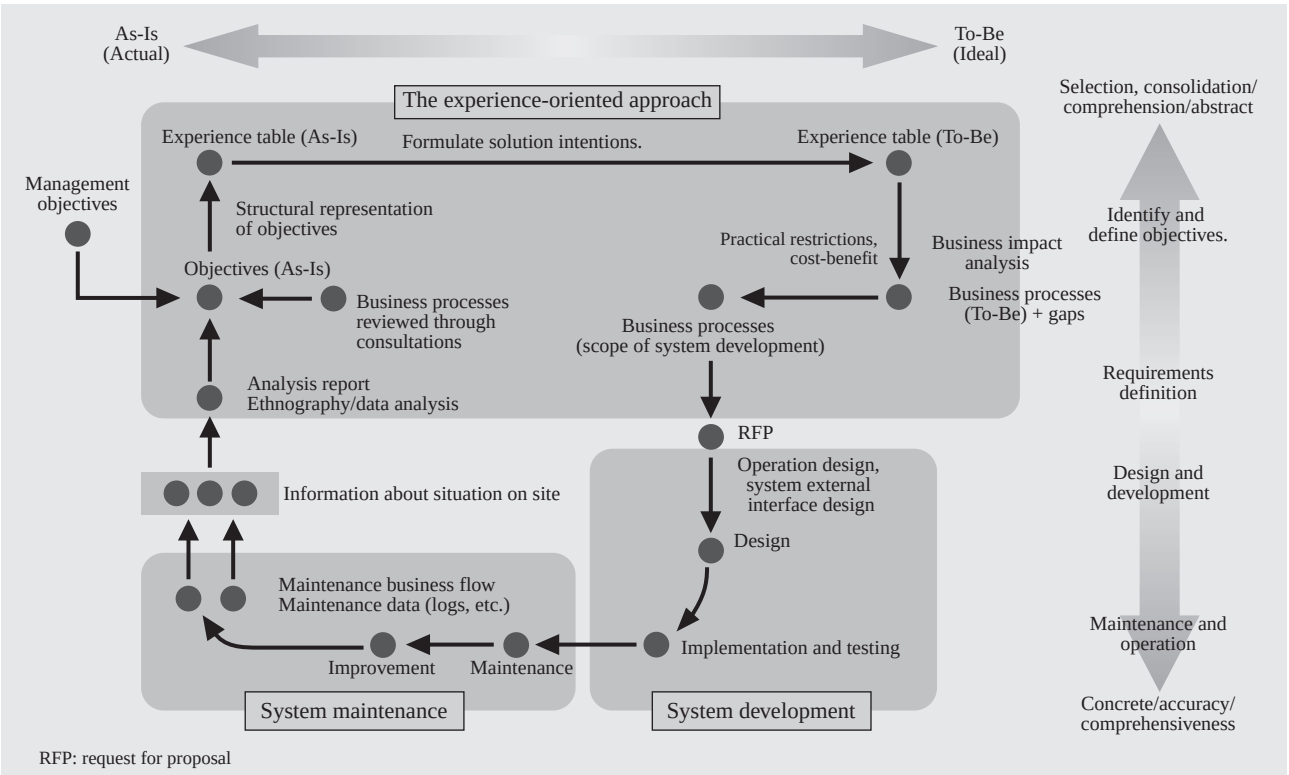

Fig. 8—The Experience-oriented Approach and System Lifecycle.
The lifecycle is linked together by filling in the gaps in the actual/ideal and concrete/abstract axes.

all system applications. Improved efficiency and quality are achieved by a one-stop maintenance service that was originally conducted by multiple vendors.

ALCM consists of the following three phases.

(1) Assessment phase

This phase involves taking an inventory of existing system resources (including programs, data, and documents), and clarifying the resources required for the maintenance work associated with modifying or expanding these system resources, and also the procedures and deliverables for using these resources for maintenance work.

(2) Transformation phase

Based on the result of the assessment phase, resources that are lacking and manual worksheets are established to ensure that maintenance can be performed in accordance with these.

(3) Execution phase

System operation and maintenance are conducted under the environment established in the transformation phase. The user's requirements are prioritized and the modifications based on the impact analysis are specified for carrying out modification and testing. While conducting maintenance, improvements are also made to the manuals for higher efficiency and for the supporting tools.

Along with operating these services, information useful for capturing the current business operation, such as the flows of customer operations, the operational and error logs, and the complaints of users, are generated. Utilizing this information in the excitement of comprehension step of the experience-oriented approach allows analysis to be conducted efficiently and accurately. In response to the abstract/concrete gap between maintenance and the experience-oriented approach as previously described, the following are the two perspectives for connecting the information from the ALCM service to the experience-oriented approach.

(1) Macro-analysis

For analyzing the issues that occurred in the current operation, the information from ALCM (the operation conditions and the error situation for a certain traffic volume and time frame) is collected for use in developing a supportive environment that provides the effective standpoints for clarifying the objectives. The gap that is identified by the on-site SEs and the staff in the To-Be operation can be perceived as "different sentiments" by viewing the collected information from the perspective of the entire operation.

(2) Micro-analysis

Here, the information for determining whether to improve the "different sentiments" extracted from macro analysis is provided by analyzing detailed situations, such as the operation steps for each operator and in each case.

Utilizing the analyzed results in the "excitement of comprehensive" step of the experience-oriented approach allows an understanding of current operation. As well as making analysis more efficient, improvements and the completion of ethnographic investigations from capturing the objectives over the long term can also be expected.

Collaborating with System Development

On the other hand, achieving consensus with customers on the business's required specifications requires connecting the contents accurately to system development. Hitachi has a standard development process called Hitachi Phased Approach for High Productive Computer System's Engineering (HIPACE) that provides a development methodology for determining the specific processes of the required operation for system development and the deliverables for inputs and outputs. The experience-oriented approach responds to each process in HIPACE, such as the specifications definition, the systematization planning formulation, the basic system structure establishment. In two of these processes, which are the establishment of basic system structure and the planning of systematization, the main task of the experience-oriented approach is to be capable of responding to the process of analyzing and developing the customer operation. The customer operation includes understanding, analyzing, and developing the operation. However, regarding the formulation of an operation model in the process of specification definition, there are incompatibilities in the aspects of abstract/concrete between the deliverables of the experience-oriented approach/experience table and the deliverables of HIPACE. The deliverables of the experience-oriented approach/experience table are for describing future images (To-Be) to be shared with customers. The deliverables of HIPACE, in contrast, are the operation flows for defining the system specifications. Therefore, a process for overcoming these incompatibilities is required when the development of the operation model is taking in the deliverables of the experience-oriented approach/experience table as the deliverables of HIPACE. The following three processes are added.

(1) In the experience-oriented approach, the experience table and the PReP models are developed based on the main operations, not all the operations. As for developing the system applications, the other operations that are not described above are also reported on for constructing the operation model.
(2) By making a mock-up of the interface screen, which is based on the operation model and the focused partial operation, the operation flow and the input/output information in each operation are defined.
(3) Based on processes 1 and 2, the required property and the structure of the data of the system are defined.

By executing the experience value described in the experience table from processes (1) to (3), it is possible to offer a system development with experience value to system users.

These three processes can provide the inputs for the Hitachi modeling framework (HMF), a model-based development environment, in future process planning. In HMF, the function of generating the programs from this model is already activated. It also brings efficiency to system development and implementation.

CONCLUSIONS

This article has described the specific applications of the experience-oriented approach, its solution patterns in actual implementations, and its development of new solutions in service businesses from collaboration with system management.

The experience-oriented approach has been adopted primarily for operation system development in the finance, manufacturing, and logistics industries. In the future, its application will be expanded to industries on which Hitachi focuses, such as collaboration with the service business and smart cities, which are expected to be markets for the information and telecommunication system. Furthermore, Hitachi would like to contribute to social innovation through "co-creation" with enterprise customers.

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