



慶應義塾大学ビジネス・スクール

Treatise

DESIGN “SLIM WORK”

– Through Banking Service Improvement –

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Abstract

Amid the prolonged sluggish period in Japan's economy, companies are actively attempting the restructuring of their organizations in order to reduce costs and improve operational efficiencies. At the same time, interest in re-engineering is also growing amidst serious reconsideration of operational structures as a whole. However, a good look at the contents of these activities and rationales reveals that they have stopped at the level of introducing the efforts of an individual corporation or expressing a general idea, and it is difficult to say that they have demonstrated methods and procedures as generally applicable outcomes.

In our research, we tried to keep this problem in mind while conducting our study, which used the example of actual operations in city banking, where we considered methods to lessen trouble and waiting time for service users (customer), and lighten work loads for the suppliers (bank clerks), to design “slim work” using simple procedures and low levels of resource investment. Specifically, we interpreted the work process within the structure of the initial state, the final state, and the necessary changes (basic transformations) needed to connect the two. From the viewpoint of achieving slim work, we considered our basic concept of work to consist only of that basic transformation, and if we should come across with any inconvenience in actual application, we would first clarify the reasons and then would design the work to add the necessary changes, as a fundamental rule. Based on this work, we propose the following three approaches, showing specific procedures for each, as methods for actually structuring and improving work: ① Designing work so that it consists only of the basic transformations. ② Clarifying all those work tasks in the present process that correspond to the basic transformation, and the elimination of all other tasks. ③ Studying the role of the “objects” used in work, and to provide substitutes of simple objects suited to “slim work”. In addition, we will apply each method to actual banking service operations, adding our considerations of the effectiveness and interactive relationships of these applications.

1. INTRODUCTION

Amid the prolonged sluggish period in Japan's economy, companies are actively attempting to restructure their organizations relying mainly on reducing costs and redefining the domain of their business operations. Particularly in banking circles, rationalization measures such as personnel cuts, branch office integration or closure, and unattended self-service banking outlet network development are being implemented one after another. On one hand, these measures contribute to overall cost reduction and the improvement of service efficiency. On the other hand, however, from the viewpoint of the customer these measures pose problems such as long waiting times at service windows when depositing or withdrawing even small amounts of money, and the many complex documents that must be prepared when applying for loans, and some of these problems have actually led to formal customer complaints. To alleviate the waiting time at service windows, some city banks have recently introduced metering systems in an effort to shorten waiting times.¹⁾ Meanwhile, from the viewpoint of bank workers, the problems of heavy workloads, such as overtime work during busy seasons and mandatory holiday work, etc., have not been alleviated. A close examination of the workload size and complexity discloses a great deal document cross-checking, confirmation, and transcription that is not directly connected to customer service and is rather retrogressive. Delays in upgrading the efficiency of such office work is often cited as a problem in the field of IE (Industrial Engineering), but we have yet to see effective analytic methodology or determinant measures to solve this problem.²⁾ Recently, re-engineering is gaining attention as a measure for drastic reform of operational problems. However, the fact remains that re-engineering is not yet sufficiently consolidated as a method of response.

The objectives of this study, keeping the above issues in mind, are to use service operations in a city bank as example, and newly design "slim work" with simple procedures and limited investment, as well as to consider concrete methods for improving the present level of service operations. When doing this, the methodology indicated in this study will be developed while keeping in mind the following three conditions to be met; it has enough generality to enable application to indirect office tasks outside of banking operations, it has clearly organized procedures, and it insures that the ideas for designs and improvements will not be simple momentary notions but can be systematically listed in many ways. Also, although it is important to verify the effectiveness and propriety of adopted ideas, this discussion will be developed from the stance requiring focus on the methodology for realizing "slim work", and ideas will be evaluated only when the necessity arises.

¹⁾ For example, refer to the article [Reducing Customer' Waiting Time] in the Nihon Keizai Shimbun, page 7, April 7, 1994, and [The Service War; Reducing Service Window Waiting Time] Nihon Keizai Shimbun, page 7, April 20, 1994.

²⁾ IE analytic methods are mainly aimed at production processes for materials. Office operations analysis, etc. are proposed for more efficient office work, but this poses difficult problems in developing truly effective improvement ideas due to complicated analytical methods.

2. EXISTING APPROACHES TO WORK DESIGN AND IMPROVEMENT

2.1 The Image of Slim Work

Let us first begin with some explanation about the word “slim work”, which is frequently used in this study.

The expression “slim work” refers to streamlined work, usually “work without waste.” In banking service operations this means that for a customer (the recipient of service), his or her waiting time is short and the required procedures are simple and easy. For the bank clerk (the provider of service), this means work that can be finished within regular hours, with fewer documents and vouchers, and easier entry methods and inspection operations. Accordingly, this improved “slim work” can result not only in reduced lead time and costs, but can also lead to a wealth of advantages. The advantage from the viewpoint of broad customer satisfaction is that bank clerks can perform operations using 70% of their capabilities, leaving a sufficient margin to enable individual customer consultation and advice within the remaining task time.

On the other hand, within the banking operations that are the subject of this treatise, since the banks must serve the public and protect the creditors there exist various legal regulations, as well as the banks’ own operational rules and regulations based on such regulations, which do not allow implementation of such immediate improvement measures such as abolishing or changing document or voucher items in our pursuit of “slim work”, whenever such actions conflict with the above-mentioned rules and regulations. However, making all these legal restrictions into preconditions will result in attitudes, approving of the status quo, causing a somewhat serious concerns that such attitudes may act in negating the free ideas needed to realize “slim work”. In this study, therefore, we have placed legal restrictions concerning the banking service operations outside the scope of our direct examination, and we will continue our study centering on as systematic a methodology as possible to uncover a variety of ideas.

2.2 Management Problems and Improvement Problems

Two ways to approach work process improvement are generally the management approach and the problem improvement approach. Outlined below are the differences between the two.³⁾

“When approaching the problem from the management angle, the current path of work progression does not fundamentally change, and we attempt to solve problems by such operational devices as changing responsibilities or authority or education or training of the staff members in charge. Since action is taken mainly in the areas of personnel and organizational structures, this approach demonstrates rather quick effects and proves effective in solving short-term problems. However these actions seldom lead to complete solution of the problems because the fundamental causes of problems are not addressed. Meanwhile, the approach from the problem improvement angle

³⁾ For further details, refer to Kawase [2], Vol. 31 No. 2, p. 80 and Vol .32 No. 1, pp. 78-80.

directly addresses the work structure which has been causing the problems, and considers achieving the desired results by changing the work structure itself. There are many cases where this approach requires considerable time and labor before the problem is solved, but the approach features a tendency to facilitate linkage with drastic long-term problem solutions.”

Let us now study the differences between these two using a concrete example. Consider for instance the problem of long customer waiting times at bank service windows. If this problem is understood as a management problem, it is possible to take such measures as improved training for window-duty bank clerks to upgrade and cultivate skills and versatility, or to increase the number of bank clerks on duty, or display the waiting times or the number of customers waiting for service in order to ask customers to return later when he or she is not in a hurry, or to entrust an outside sub-contractor with some part of service operations. These methods will bear results in a comparatively short period of time. In contrast, however, negative effects may arise from these methods; when a bank clerk usually on duty is transferred somewhere else, the situation will return to its previous state, and it requires new staff and job hours for training. However, when approaching the problem from the problem improvement angle, we will for example analyze the service operation work process, and eliminate unnecessary steps and vouchers, changing the way the work itself is performed at the window. This is more time-consuming when contrasted against the approach from the management problem angle, but in contrast, ideas for improvement can be developed without relying upon the abilities and personalities of the bank clerks on duty.

During actual corporate activity, it is important to properly differentiate and deploy the two above-mentioned approaches as the occasion demands. However, it is obvious that the approach from the problem improvement angle is suited to the achievement of “slim work” objectives. From here on, therefore, we will adhere to the problem improvement approach when considering proposals for improvements, and attach importance to ideas changing the work process itself. We will progress our consideration of situations from the standpoint of not involving ourselves deeply into ideas extending into personnel abilities and organizational systems based in the management problem approach.

2.3 The Analytic Approach and The Design Approach

The processes to gain ideas for improvements or discover problem points in the work process can be divided broadly into the analytic approach and the design approach. Using the former, we analyze the current work process using various methods, and using the analysis results we discover problematic points and guide our ideas for improvement. Using analytic methods, we may employ such tools as process analysis, labor analysis, behavior analysis, or operation analysis, borrowed from the field of IE. Also, as methods for the creation of ideas for improvements, we may have at hand such tools as the 5W1H questions, the ECRS principle, behavioral economy principles, or Serbrig’s Checklist. Therefore, one advantage to this method is that anyone can be engaged in analyzing work processes after some instruction and training. In contrast, however, it has the drawback that obtaining epoch-making improvements is difficult, considering the time consumed in the analysis

process.

Against that backdrop, the philosophy of the design approach is to disregard the current process and draw an ideal or desirable work process description, based on which new work methods are designed. For example, we can cite the concepts of “function development” advanced by Nadler and “State A and State B” advocated by Crick.⁴⁾ Of these, the better-known concept of functional development refers to a method where objectives are repeatedly questioned: Why is the work to be performed, for example, is used to clarify the higher rank function (objective), and try to design the work desirable to accomplish that function. However, there are such problems as the frequent cases of listing functions which deviate from the original scope of the work. Also, the difficulty of ideal work images with no time or cost constraints being out of touch with realistic ideas arise from inadequately programmed procedures to pursue the upper-rank functions. The design approach normally features the advantage of fewer analysis difficulties and greater opportunities to discover ideas for dramatic improvement, but at the same time harbors the contrasting drawback of tending to list unrealistic ideas ignoring real restrictions.

Accordingly, although the design approach is suitable from the standpoint of substantially streamlining the work flow, we cannot downgrade the advantages of the analytic approach from the standpoint of applying to improving and designing services that realistically exist within banking service operations, and of aiming at achieving a technique that anyone can employ to list improvement ideas systematically. Therefore, in this study, we will employ both of the two above-mentioned approaches, and advance our examination aiming to propose approaches which possesses the advantages of both.

3. Quantifying Work and Basic Conceptualization

3.1 The Initial State, Final State, and Basic Transformations

In general, in any work, an “initial state” and a “final state” exist, which serve as partitions. For example, the initial state in a final assembly process of an automobile is the state where a car body with a completed coating from the first process of the assembly line arrives, and the required parts and units such as tires and engines are installed during each process. The final state is the situation where the car inspection has been finished and the car is driven off the line. It is possible to change the width of the partition (process range) according to the aims of the analysis. In the above-mentioned situation, it is possible to change the definition of the initial state to include the coating process and body installation process. It is also feasible to include the distribution process, so that the condition of the finished car arriving at the dealer is defined as the final state.

Observation of an actual working process shows a multitude of various operations over the passage of time, such as various worker actions, machine and equipment operations, various inspection or checkup operations, exchanges of information among workers, entries to books to transform the above-mentioned “initial state” to the “final state”. Here let us examine the differences between the initial state and the final state by segmenting those operations into those operations absolutely required; those operations that cannot be

⁴⁾ For further details, refer to Fujita [6] pp. 342 - 350.

eliminated at any cost, as opposed to all other operations. We will discover that although the operations dealing with the difference between initial and final state cannot be eliminated, we can eliminate other operations. For instance, we can do away with such operations as the handling and transportation of parts and materials, or the discussions of arrangements among the workers. These do not directly contribute to the production of the final state. Accordingly, the work dealing with the difference between the initial state and the final state will be referred to as a “basic transformation”.⁵⁾ The basic transformations are those which cannot be eliminated as long as the initial state and the final state remain the same. In that sense, we may say that it is equivalent to a working step that bears added value to the present work.

As an example, let us imagine a “paper-cutting operation” to “pick up a sheet of paper on a desk and cut it into two sheets with a pair of scissors”. In this work, we can convert an initial state of a single sheet of paper into a final state of two sheets of paper, and so the basic transformation in this work is to “divide the paper into two sheets”. Looking into the actual work process, you will find, for instance, that such operational steps exist as picking up the sheet of paper from the desk, picking up the scissors, and putting the scissors back into place. Yet none of these operations corresponds to the basic transformation. For example, the operation of picking up the scissors and placing them back originates from the use of the scissors. To achieve the objective of dividing the paper into two sheets, other tools such as human hands, paper cutters, etc., will suffice.

To realize “slim work”, it is desirable to move from the initial state to the final state with as little change as possible. Therefore, in designing “slim work” or to improve assigned work, you must first analyze what the basic transformation work is, and you must question if the work can be accomplished simply through the basic transformation alone. Those questions become the starting point. By drawing an image of the work made up solely of its basic transformation, you can then obtain the inspirations for “slim work” which is free from the methods and procedures used in the current work, and the steps used in the current situation. Of course, the operational steps outside the basic transformation will become necessary to fulfill the idea as real work. However, even in this case, we should keep added operations to a minimum, permitting additional operations only after fully examining the reasons for their necessity. This attitude constitutes an important way of thinking in the realization of “slim work”.

3.2 Objects Used in Work and their Roles – Applicable Objects and Expedient Means

The work process usually employs a variety of objects. For instance, observing the service window operations at a bank, you will see such people as customers, bank clerks on duty at the windows, the staff in the back, the ushers at the bank, and various objects such as bankbooks, cash, various slips of paper, legal seals for documents, ball point pens, writing tables, cartons, number tickets, and so on. Along with those visible objects, there are the invisible objects called information, exchanged through conversations between the customer and the bank clerk at the window, and between the window clerk and the staff in the back.

⁵⁾ For details regarding the concepts of basic transformation, refer to Nakamura [5] Chapter 2, Paragraph 5, pp. 86-99.

When designing or improving “slim work”, the objects employed in such work should not be treated uniformly. The roles played by the individual objects must be examined. It is imperative to break down the objects into those groups that play important roles in achieving the work aims, contrasted with those groups of objects that are not vital. Taking withdrawal transactions at the service window as an example, the customer and the cash are objects which play roles important to the customer’s aim of carrying home the cash, whereas the number ticket and the carton become objects with a relatively lower level of importance.

To express these concepts in a concrete manner, in this study we will divide the objects used in work into two types; namely, applicable objects and expedient means. The applicable objects refer to the objects (the customer and cash in the above-mentioned example) required to achieve output in the working process: the expedient means refers to the objects that perform various functions in the working process to yield output. Referring to the above-mentioned example, the legal seals for documents is a means to identify that a customer is the depositor. A carton is a means used to hand cash to the customer. Thus, the number ticket serves as a means to identify that the customer requesting payment is the same person as the customer to whom the cash is to be surrendered.

In designing “slim work”, the concept of first identifying an applicable object, determining its characteristics and technical specifications, then bringing into use an appropriate expedient means for the situation. For instance, if you decide to use the means of a carton in the example mentioned above, such trouble as difficulty in picking up coins, or large numbers of bills sliding off the carton, may occur. Also, it may not be necessary to ask a regular customer known to the bank clerk on duty be bothered to use a legal seal on documents. Furthermore, the paper slips presently used may require much time to fill out and manually confirm — not a “slim” process. In this study, therefore, we adopt the philosophy of eliminating the objects used at present, and will newly design objects suited to “slim work”, without consideration of the currently employed expedient means.

4. Designing “Slim Work”

We propose three different types of methods to approach the design of “slim work” in this study. The considerations and procedures for each method are explained in the following sections.

4.1 Designing Work Composed Solely of Basic Transformations

This method employs a conceptualization of the basic transformation explained in Chapter 3.1 in the design of “slim work” which consists solely of basic transformations; if we encounter any inconvenience in work performance, we then clarify the reason, and re-design the work by adding the required changes. Procedures are described as follow.⁶⁾

Step 1. After defining an initial state and a final state of the targeted work, we break the current work into steps for analysis. We then clarify the contents of work, the aims or purpose (roles) of each step, and the objects used.⁷⁾

Step 2. Focusing on the final state, we consider the overall purpose of the work and the customer demands, and define the final product to be output. In a similar manner, focusing on the initial state, we define the materials necessary to make the product. After doing this, we list the elemental objects constituting the product and the material. If there are any objects included in the materials but not included in the product, we newly add them to the final state, and in the reverse situation, if there are any objects in the product but not in the materials, we will add them to the initial state⁸⁾

Step 3. We analyze the difference between the product and the materials, and we list the changes that cannot be eliminated and still link the gap or difference between initial and final that forms the basic transformation. If you find it difficult to understand the basic transformation, refer to the analysis of the current situation performed in Step 1. You may then describe the basic transformation by considering which steps corresponds to the basic transformation. Remember, however, that the worded description does not include the expedient means, and whenever possible, word your description to eliminate any restrictions from the current work practices.

Step 4. Try to design work comprised solely of the basic transformation as analyzed above. At this time, do not evaluate the feasibility of materialization, but list ideas freely.

Step 5. Examine your efforts, and see if there is any inconvenience or problem in the work designed in Step 4 above to actual application. To be specific, analyze the

⁶⁾ In view of the original aims, the analysis of the current processes is not necessary. We, however, felt that the analysis of the product, materials, and basic transformations might be conducted more comfortably, and in this treatise propose including procedures which also include the analysis of current processes.

⁷⁾ The segmentation method used during the analysis of current processes into steps employs the philosophy that no single step should serve multiple purposes, and that the decisions should be made by the person conducting the analysis with consideration to the labor involved in the analysis work.

⁸⁾ This procedure corresponds to the principle of material balance, which states that “no product is made from nothing, and no material constituent substance vanishes mid-process”. (For details, refer to Nakamura [5] Chapter 2, Paragraph 3, pp. 62 - 67.)

conditions (technical specifications) to be satisfied in the actual work, bearing on the materials and the product listed in Step 2, and examine your efforts to confirm whether such conditions are satisfied by the designed work. If they are not satisfied, add such conditions to the material and to the product, list the changes that are newly required for such conditions, noting them as a sub-transformation, and re-design the work so that it is composed solely of the basic transformations and the sub-transformations.

You must take particular care in the series of above-mentioned procedures to express your wording of the analysis of the basic transformation as functions. For example, in the previously mentioned “paper cutting operation”, the wording “separate the paper into two sheets” is more desirable than “cut the paper into two sheets” since many other methods of separating the paper are conceivable. Moreover, by avoiding any wordings which include expedient means, such as “cut with a pair of scissors”, a reader is enabled to conceive of other means of cutting (or separating) the paper outside of using scissors. Such considerations are an important point, because among those many alternate ideas, an idea desirable from the viewpoint of “slim-ness” exists.

In our continued application of this method under actual conditions, avoiding excessive concern over the details of the expedient means such as tools and equipment, and having a flexible stance, is a necessity when considering the ultimate in “slim work”. It is possible to achieve this ultimate solely through the basic transformation and the sub-transformation. For a person well versed in the particular actual operations, there may be some resistance to the concept of considering idea design without adhering to the feasibility of either materialization or expedient means. However, it is extremely important to return to our original point: To design truly “slim work”, the work consisting solely of the absolutely necessary changes (basic transformation and sub-transformation) must be sought. It sometimes happens that points at issue, until then unnoticed, come to light and new ideas suddenly arise from such objective-oriented thinking processes.

4.2. Eliminating Steps Outside the Basic Transformations

This method, where although no basic transformation can be eliminated as long as the product and the materials remain unchanged, any other working steps may be eliminated based on the viewpoint that the product is obtained from the materials. In this way, all steps are considered useless except those corresponding to basic transformations under the present work processes, and effort is made to realize “slim work” through the elimination of useless steps wherever possible.

The procedure employed is to first clarify the steps corresponding to the basic transformation found in the results of analysis of the current work process after following the same steps mentioned in the previous chapter as Steps 1 through 3, and subsequently to question whether the elimination of other steps is possible. Although it is possible to consider those sub-transformations mentioned in Paragraph 4.1 are, along with the basic transformations, also steps which cannot be eliminated, it is at the same time not desirable to include too many steps in the group of those which cannot be eliminated in designing “slim work”.

We must study the purpose and the role of each step in creating ideas to eliminate

unnecessary steps to obtain “slim work”. Subsequently we should question the need for that particular step within the entire work process, what kind of trouble might arise if we eliminate that step, etc., and this process will eventually lead to concrete ideas. At this time, we should identify the applicable objects and the expedient means within each step. It will then become easier to discover new ideas – such as eliminating one step of the work, or combining one step with other steps - by questioning whether we can exchange the applicable objects for simpler structures, or can substitute the effective means with a different object, or totally eliminate it.

For example, with the deposit withdrawal service at the banks, in many banks now, number tickets are handed to the customers, and are retrieved later. However, if the product of this work is regarded as a customer who receives cash, the exchange of the number ticket is not part of the basic transformation. Therefore, since the purpose of handing the number ticket to the customer is to identify that the customer who has asked for withdrawal and the customer who receives the cash are identical, it then becomes possible to eliminate a series of work steps on the basis of certain ideas. For example, the bank clerk can ask the customer to wait in front of the window, or ask the customer to declare self-identity instead of presenting the number ticket, and so on.

4.3 Discovering Alternate Proposals Based on the Roles of Objects

Actual working process employs many kinds of objects, and those objects fulfill various functions (roles) to achieve the aims of that work. In the above-mentioned deposit withdrawal service, for example, a paper slip, an object, plays a role in conveying from the customer to the bank clerk such information as the depositor’s name, account number, the date, and the amount of withdrawal. Also, the bankbook not only records the details of transactions and the balances, but also plays a role in presenting the name of the depositor as well as the account number.

In carrying out the work, if these objects are found to be difficult to handle or if proper objects are not used, extra work will result, making no contribution to “slim work”. For instance, if a paper slip is not designed to obtain legible writing, the bank clerk on duty must call the customer over to check the information. Also, if it takes time to open the bankbook to the desired page, we cannot say that the bankbook fits in with the idea of “slim work”.

These objects can be readily listed since they are visible, physical solids, and enable the study of the roles they play in work without first analyzing the current work process and basic transformations. In this study, therefore, we propose to list the objects used in the present work, study their roles, and eliminate some objects or change them to different objects. Specifically, we adopt the following two methods:

- (1) Giving thought to the roles played by the objects used in the work, and substituting for these other objects which play the same roles from the viewpoint of gaining “slim work”;
- (2) Listing unnecessary work steps (work steps other than the basic transformation)

enable elimination of such steps.⁹⁾

Referring to the “paper cutting operation” mentioned previously, the first method is where we consider the role of scissors in cutting the paper, and give thought to the tools (cutters, blades, etc.) which can play the same role with greater speed. The second method, in contrast, is a method where we consider the objects that can eliminate such needless steps as picking up and putting down the scissors. Such ways of thinking may uncover ideas; for instance, fixing the blade of the scissors on the desk and pressing the paper against the blade to cut it.

5. Application to Banking Service Operations

In this section, we will explain in a concrete manner ideas for “slim work” by applying the three methodologies introduced in the previous section to actual banking service-deposit withdrawals at the bank service window.

5.1 Analysis of Present Work

Table 1 shows the analysis of work, divided into the steps taken when a customer withdraws a fixed amount (x yen) from his or her deposit account, through the service window of a bank. Here, a series of operations conducted continuously for a fixed period of time is consolidated into one step. When a plural number of purposes exist for one step, we will itemize them respectively in the column titled purposes (roles). The objects used in each step will all be listed in the column titled objects. Although this work at a glance looks simple, you will find that there are as many as seventeen different kinds of objects used.

⁹⁾ In this study, we will pursue “slim work”, including such work as is generated outside the scope of work segmentation, and targeted as unnecessary work created by the existence of objects.

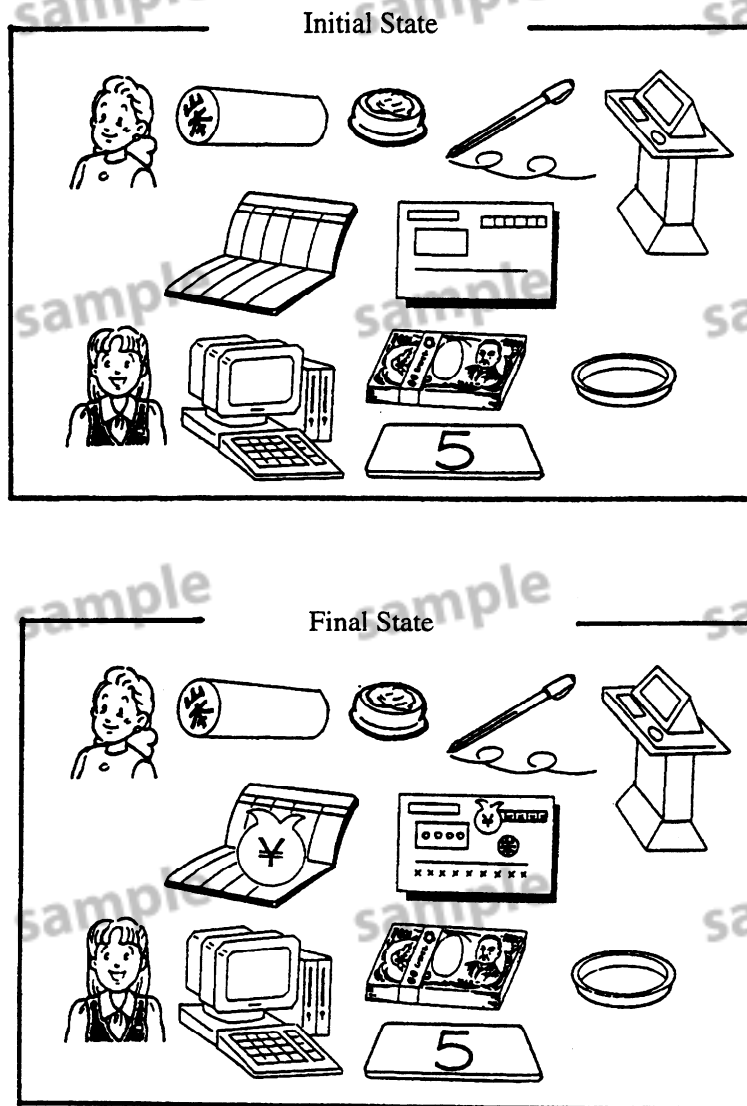
Table 1 Deposit Withdrawal Operational Flow Chart

Working steps	Purposes (roles)	Objects
(1) At a writing table, a customer enters onto a paper bank application slip: 1. Name 2. Account number 3. Date 4. Amount	(1) The customer expresses his wish to [receive x yen in cash] in the form of information.	Customer Writing table Ball point pen Bankbook Paper slip Legal Document Seal Vermilion inkpad
(2) The customer presents his or her bankbook and the completed paper application slip at the window (counter), and a bank clerk accepts them, offering a small carton for conveyance.	(2) The customer conveys to the bank clerk the information prepared in (1) above.	Customer Bank clerk Bankbook Paper application slip Counter Carton
(3) The bank clerk checks and confirms the following two points in front of the customer: 1. Is there any omission or oversight in the information written on the paper application slip. 2. Is the legal document seal on the paper slip identical to the seal registered with the bank. Upon completion of the confirmation, the bank clerk stamps both the receipt stamp and the verification stamp on the paper application slip.	(3) 1. The bank clerk checks the entry contents on the paper application slip. 2. The bank clerk confirms the customer's identity as the depositor. 3. The bank clerk re-confirms the contents of the transaction requested by the customer.	Customer Bank clerk Bankbook Paper application slip Receipt stamp Verification stamp
(4) The bank clerk hands the customer a number ticket from a supply nearby, and enters that number into the column for number ticket on the paper application slip.	(4) The bank clerk hands to the customer evidence of due receipt of the paper application slip, and keeps a record of this.	Customer Bank clerk Number ticket Bankbook Paper application slip Ball point pen
(5) The bank clerk inserts the bankbook into a computer terminal.	(5) The bank clerk sets the terminal mode to process the customer request.	Bank clerk Terminal Bankbook
(6) The bank clerk checks the paper application slip and enters the amount requested on the ten-key pad on the terminal.	(6) The bank clerk enters the amount of the transaction into the terminal.	Bank clerk Terminal Bankbook Paper application slip
(7) 1. The bank clerk inserts the paper application slip into the terminal and presses the [Enter] key. 2. The terminal starts a print out onto the paper application slip, and cash is dispensed	(7) 1. The bank clerk transmits the data on the terminal to the bank's main computer. 2. The custody of the cash shifts from the bank to the customer.	Bank clerk Terminal Bankbook Paper application slip
(8) The bank clerk checks and confirms that the information printed on the paper application slip and the information written by the customer are identical, and then stamps the entry stamp on the paper application slip.	(8) The bank clerk checks and confirms that there are no input errors on the terminal.	Bank clerk Paper application slip Bankbook Cash Entry stamp
(9) The bank clerk places the bankbook and cash on the carton and calls the name of the customer displayed on the bankbook.	(9) The bank clerk calls the customer for visual confirmation before handing over the bankbook and cash.	Bank clerk Bankbook Cash Carton
(10) 1. The bank clerk receives the number ticket from the customer. 2. The bank clerk confirms that the number on the ticket and the number written on the paper application slip are identical. 3. The bank clerk stamps the number ticket collection stamp on the paper application slip, and releases the cash to the customer.	(10) The bank clerk visually confirms the customer's identity as the one authorized to receive the bankbook and cash, and then hands these to the customer.	Customer Bank clerk Bankbook Paper application slip Cash Number ticket Carton Collection stamp
(11) The bank clerk puts the paper application slip into a designated case.	(11) The bank clerk keeps the documents evidencing the bank transaction in his or her custody temporarily to prevent them from being scattered.	Bank clerk Paper application slip Paper application slip case

5.2 Product, Materials and Basic Transformations

Unlike the direct operation of producing materials, in office work such as the deposit withdrawal service, there are many instances where the product and the materials cannot be defined as visible items. To define the product and the materials, therefore, the initial state for this work is defined as the state when the customer enters the bank. The final state is defined as the state when the customer leaves the bank after a bank clerk finishes the transaction work. If the objects existing in these respective states are listed and illustrated, they will appear as shown in Fig. 1. Such figures should be prepared for easy understanding of the characteristics of respective objects (forms, shapes, quantities, attributes, etc.)

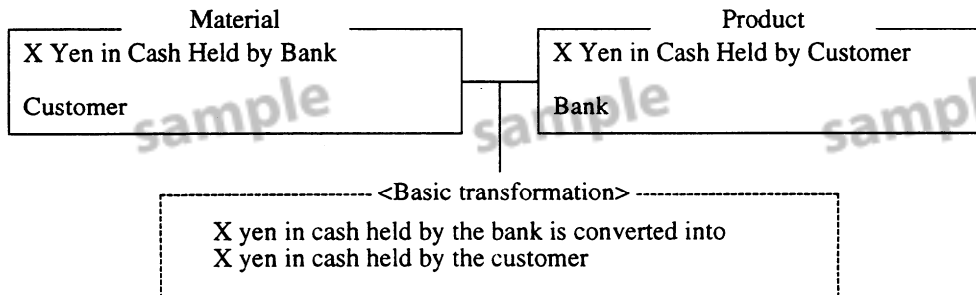
Fig. 1 Objects Appearing at Initial and Final States of Banking Withdrawals



Next, we look at the final state shown in Fig. 1 and ask what satisfies the needs of the customer, and what are the objects needed by the customer, to arrive at a definition of the product. In this example, what the customer takes home are the bankbook and x yen in cash, but since in general the bankbook is a means to record the balance, etc., the x yen in cash becomes the aim. When the attributes of this aim are examined, the product can be expressed as the x yen in cash held by the customer, since the fact that the cash is the property of the customer is an important specification. Meanwhile, the material for producing this product is, after all, the x yen in cash, and if this attribute is examined, it can be expressed as the x yen in cash held by the bank.

When the product and the material are defined, as seen above, the basic transformation in this work becomes the transformation of the x yen held by the bank into x yen in cash held by the customer, which is the difference between the two. Considering the material balance, the bank is added to the final state and the customer is added to the initial state, resulting in the structural diagram of the work seen in Fig. 2.

Fig. 2 Withdrawal Service Initial and Final States and Basic Transformation



5.3 Work Composed Solely of Basic Transformations Plus Sub-Transformations

Designing "slim work" composed solely of the basic transformations mentioned earlier results, for example, in the following ideas concerning the work:

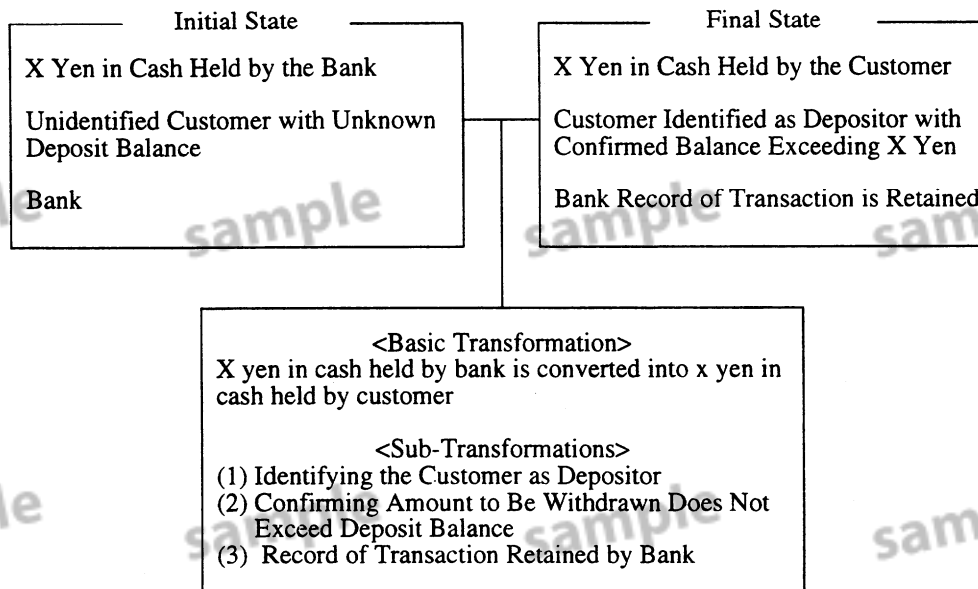
- ◆ Cash in a heap is placed on the bank service window counter; the customer counts out x yen, and takes the money home.
- ◆ A bank clerk withdraws the amount of money specified by the customer, using a terminal.
- ◆ A bank clerk receives a request for withdrawal from the customer by phone, and he or she delivers the amount of money to the customer.

These ideas are exceptionally "slim", considering the bank clerk's workload and the customer's waiting time, but various problems may be seen when this is contrasted against the present operations. To clarify such problems, we examined all the objects appearing in the initial and the final states, as shown Fig. 2, and the requirements that must be satisfied by these objects. We found the following requirements:

- (1) The customer is identified as the depositor;
- (2) The amount of cash does not exceed the deposit balance;
- (3) The bank keeps a record of the transaction concerned.

Accordingly, confirmation that these three conditions have been met will be added to the work structure as sub-transformations required for this work. With the addition of these sub-transformations to the work structure, the structural diagram of the work will appear as shown in Fig. 3.

Fig. 3 Structural Work Diagram Including Sub-Transformations



5.4 Designing Work Composed Solely of Basic and Sub-Transformations

Subsequently, if we make a trial design of the work composed solely of the basic transformation and the sub-transformations shown in Fig. 3, for example, the following ideas emerge:

- ◆ When the customer visits the bank, the customer is identified through some steps, the bank clerk hands the balance in cash to the customer, the customer removes x yen from that amount, and the balance data is revised;
- ◆ Some mechanism (auto lock, etc.) allowing only the customer into the bank is installed, the customer withdraws the required amount from his or her own safe, and he or she types in the entry of the amount into a terminal by himself or herself;
- ◆ When a bank clerk delivers cash to the customer, he or she carries a portable computer, and enters the amount of cash delivered at that time and location.

Such ways of thinking facilitate, for instance, the free listing of “slim” methods, letting the customer declare his or her name and account number, name and date of birth, place of employment and title, as the steps in identifying himself or herself, without being shackled to the currently adopted method. In fact, some parts of this approach have already been put into practice in the postal insurance and credit card companies. In addition, the use of a portable computer is a breakthrough that considerably reduces the number of complicated paper forms and slips. As seen above, the approach of continuous design and improvement of work, with the attitude of constantly questioning what must be achieved in this work, how

the work can be streamlined by eliminating waste, and so on, will become indispensable. Such an approach will pave the way for ideas which greatly change the flow of our thoughts, which are always apt to be influenced by whatever confronts us in the current situation.

5.5 Elimination of Steps Not Corresponding to Basic Transformations

In the analysis of the present process shown in Table 1, what applies to the basic transformation in this work is limited to the steps where amount entries are entered onto the terminal and cash is discharged in items (6) and (7), and the step where cash is handed over to the customer in (10). Now, let us study in a concrete manner the ideas generated to eliminate all steps other than these.

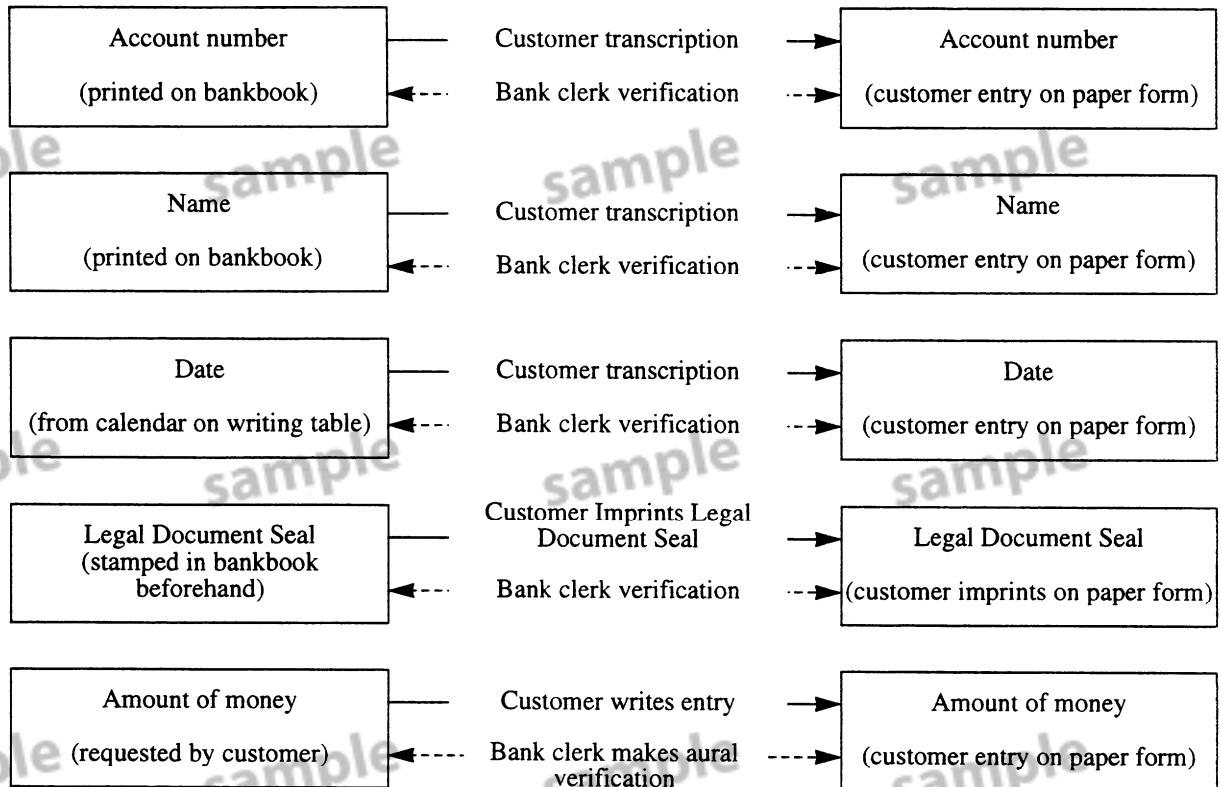
At first, we arranged the purposes for the individual steps shown in Table 1 as follows:

Working steps	Purposes
(1)	Customer prepares information
(2)	Customer conveys information to bank clerk
(3)	Bank clerk confirms information
(4)	Bank clerk hands evidence to customer
(5)—(7)	Information is entered into machine and cash is withdrawn
(8)	Bank clerk confirms information
(9)	Product is prepared to be moved
(10)	Bank clerk confirms information and hands cash to customer
(11)	Bank clerk deals with aftermath of work

Examination of the above reveals that there are as many as three steps, numbers (3), (8), and (10), in which the bank clerk checks and confirms information. If the reasons for these checking operations were required can be made clear, it becomes possible to discover ways to eliminate these three steps.

Fig. 4 shows the confirmation process from two points of view, from what the customer saw and prepared as information in work step 3 in the current situation, and from what the bank clerk saw during the check and confirmation process. It is obvious from this figure that the bank clerk is engaged in the verification of information transcribed by the customer from the bankbook and the calendar on the writing table, and only the amount of money is not a transcription. In other words, it becomes possible to discover various ideas from the viewpoint of eliminating information transcription operations as mentioned below.

Fig. 4 Transcription Operations and Verification Data Sources



[Account number, Name]

- ◆ The account number and customer name are printed on paper forms in advance and handed to the customer (personal check equivalent).
- ◆ A copier is provided on the writing tables for copying the cover of the bankbook, and the paper copy is used as the paper request form.

[Legal Document Seal]

- ◆ At the time an account is opened, many paper forms are stamped with this registered legal document seal under the watchful eyes of a bank clerk. (If necessary, the bank will imprint a verification stamp on the spot).

[Date]

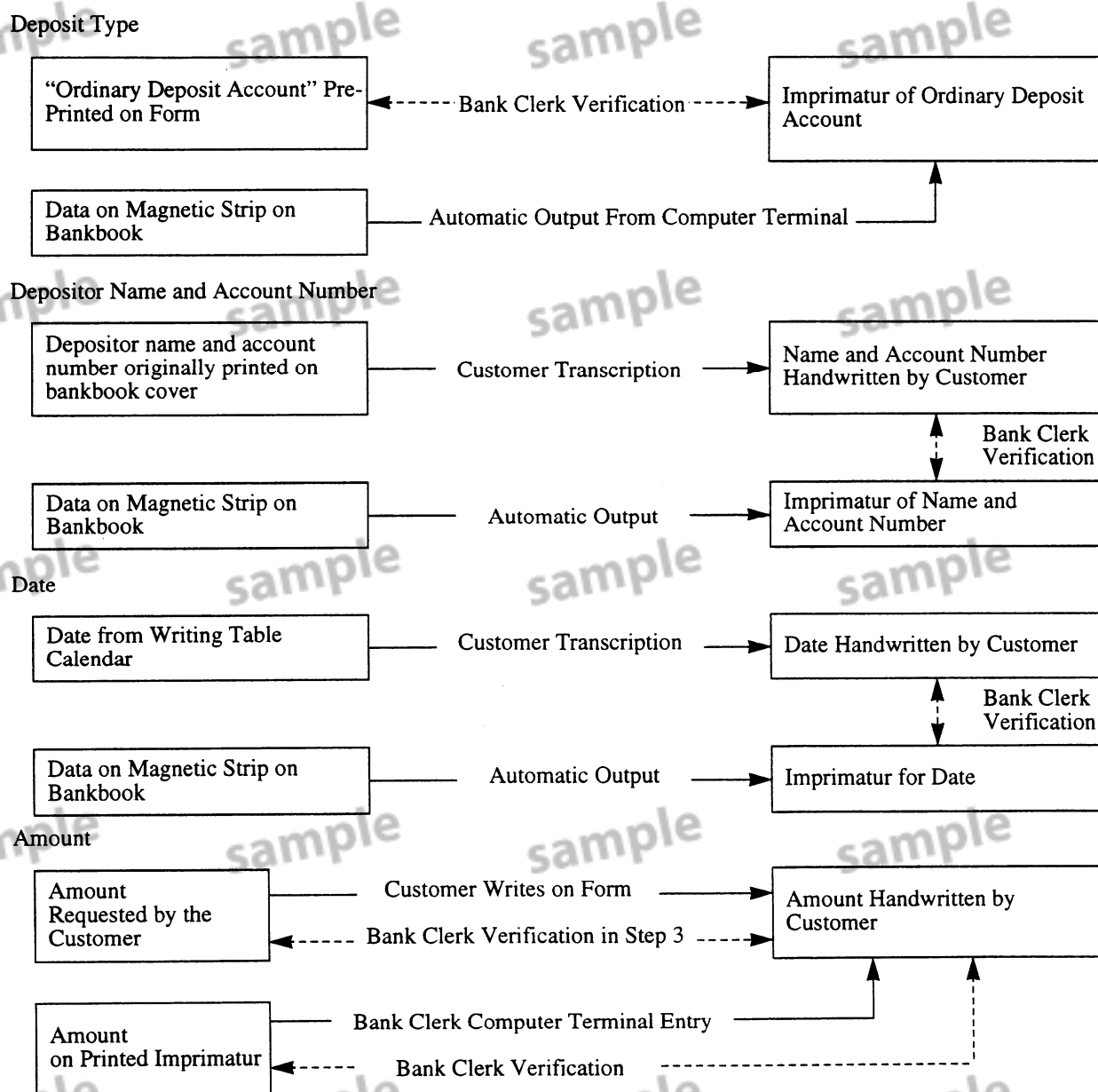
- ◆ A timecard type date printer is installed near the writing table.
- ◆ Date printing functions are added to the above-mentioned copier.

These ideas can lead to saving the bank clerk from subsequent confirmation tasks by eliminating the customer need to transcribe data from a source onto a paper form.

Fig. 5 shows a comparison of the operations involved in information preparation and confirmation work using the data source, describing Step 8 as was done for Step 3. Looking at this, you will find that it seems to show the comparison and verification of two different

kinds of information. However, this information is controlled by the bank, and nothing other than what was output into two different forms has been verified by the bank clerk. Consider the four types of information outside the amount of money, and you will find that the entire process can be eliminated if the customer's own task, the transcription of data onto the paper form, is eliminated. The amount of money the customer entered onto a paper form slip, for example, could then be directly input through an OCR, or the customer could input the data directly onto the terminal without writing it onto a paper form slip, saving the bank clerk the trouble of confirmatory operations.

Fig. 5 Data Sources for Information Preparation and Confirmation in Step 8



While we must forego descriptions of ideas on other work steps due to a lack of space, by analyzing the reasons why each work step is required in this a manner, ideas for how to eliminate these types of work steps will be uncovered. Work featuring reduced work steps leads to “slim work” through the fewer job hours spent in work by the bank clerks and the reduced waiting time for the customers. This method does consume more time and labor than the process of designing work composed only of the basic transformations mentioned previously, in that both the aims and reasons must be analyzed individually. This is advantageous from the point of view that new ideas can be developed using current work steps as clues, enabling the creation of practical and applicable ideas.

5.6 Search into Substitute Ideas Aiming at Role of “Object”

As shown in Table 1, in the deposit withdrawal operations, various objects, such as bankbooks, paper form slips, cartons, etc., are used. These objects play various roles in the work steps, but by substituting more versatile or multi-purpose objects for the present objects, we can facilitate the work, reduce handling time and labor, and enable quick and easy “slim work” hint gathering. In actual practice, the role played by the objects in the work steps should be seen in abstract, and the purpose for the use of the object should be pursued specifically to devise a different expedient means to achieve the purpose intended. It is also effective to shift the level of conceptualization up and down, and devise substitutes by asking the following questions as occasion demands:

- (1) Who needs the object?
- (2) What sort of trouble will occur if the object is eliminated?
- (3) Can a plural number of objects be put together in one group?
- (4) Can we simplify the structure of the object? Can we change it into a stabilized structure?
- (5) Can we lighten the weight of the object? Can we turn it into an easy-to-handle size?

For example, in the present work the bankbook plays a role as a source of information when the customer enters his or her account number and name on a paper form slip. The bankbook serves as a source of information when the bank clerk verifies the imprint of the legal document seal in Step 3. It also serves as a source of information for the bank clerk who enters the customer’s name and account number on a computer terminal in Steps 5 and 6, and serves in the work step of recording the transaction and the balance in Steps 7 – 10. If we pursue inquiry into the purposes for using the bankbook to upgrading its roles, or question whether we can eliminate the bankbook, or for whom the bankbooks are they required, the inquiry may result in the following ideas:

- ◆ The use of paper form slips with pre-printed account numbers and depositor names enables the elimination of the bankbook cover.
- ◆ By printing the details of the transactions on separate sheets of paper, which are mailed or transmitted by fax or e-mail on a computer network, we can find substitutes for the role played by the bankbook contents.

- ◆ By transferring the magnetic strips on the front and back covers of the bankbook onto card-like sheets, we can facilitate insertion into a computer terminal by the bank clerks.

A combination of these ideas can result in the idea to divide the bankbook itself into a magnetic card for keeping in a wallet or a commuter-ticket holder, and a separate detailed statement of transactions. In this way, the customer does not need to bring the bankbook to the bank at the time of withdrawal, thus eliminating the operations verifying the information recorded in the bankbook, and resulting in “slim work”. Furthermore, if a detailed statement of transactions is forwarded to the customer only once a month, the bank clerks’ workload can be further reduced by batch processing.

By adopting a similar train of thought, it becomes possible to devise ideas for “slim work” which eliminate further use of the paper form slip itself. The role of the paper form slip to communicate the amount to be withdrawn can be played by the customer orally informing the bank clerk to that effect. Also, the role of communicating the customer account number to the bank clerk can be played by the card which substituted for the bankbook in the example mentioned above.

5.7 Eliminating Unnecessary Work Generated by Objects

If we look at the bankbook, we see its existence causes extra handling tasks during withdrawal operations, and at the same time, even in fields outside the targeted operations, collateral tasks such as preparation, dealing with the aftermath, etc., become necessary, and increase the workload of the bank clerks. Here, let us uncover some ideas to eliminate needless work created by the existence of the objects, focusing mainly on the viewpoint of those latter collateral tasks.

When first observing a bankbook, when the customer leaves it at the service window and returns home, or when the bank clerk in charge of certain customers (the so-called outside office worker) receives and retains it, we see this has created the tasks of preparing a control book to record the details of the retained bankbooks and follow the issuance of relay slips. The bank clerk in charge of certain customers must daily count the total number of bankbooks received and retained, make entries into the control book, and store the bankbooks in a safe after obtaining the manager’s imprimatur for that day. Also, for unused brand-new bankbooks, there are similar inventory jobs involved. From this short description you can realize that retaining and processing the bankbooks of unhurried customers at some later date, after bank closing hours in an effort to shorten the waiting time at the service window can result in considerable increase in the burden on the bank clerks. At the same time we should also note that increasing the variety of bankbook covers under the pretext of upgrading customer service run against the goals of “slim work” in view of the increased inventory jobs.

Again, looking at the paper form slips, a detailed check, called a second-level check, is mandatory. In this case, a third bank clerk must stamp document seals of receipt and verification on prescribed spaces. He must stamp a document seal confirming the collection of the number ticket, confirm that the amount printed out at the computer terminal is consistent with the amount written by the customer, and so forth. Thus, it is not unusual to

see more than one hour of overtime work devoted to minute investigation of the day's total number of paper form slips. Additionally, errors during the detailed checks generally become the target of negative performance reviews of the bank's branch offices. We may further add that the paper form slips become a target for permanent retention based on operational regulations. Because of the limited space in the safe, they must be packed into cardboard boxes and transported to a warehouse once about every six months, expending a great deal in labor, work hours, and transportation costs. If these extra jobs are examined further, you will see the true effects of the concept of eliminating the paper form slips, whether by asking the customers to verbally declare the amount to be withdrawn, or by letting them key in the data entries to the computer terminal by themselves.

The legal document seals are the last objects for our study. Having the customer affix the legal document seal on the paper form slip for the withdrawal operations causes the additional work steps of legal document seal verification by the bank clerks. Verification of various legal document seals for individual customer document seal use is not only a time-consuming operation, but also it results in mental fatigue on the part of the bank clerk. Also, the legal document seals registered by customer are retained by the bank in the form of official legal document seal registration certificates, and this results in the creation of the extra work insuring the safekeeping of all the seals in the safe at the end of daily service operations. In addition, when a customer loses a legal document seal, complicated procedures for legal document seal replacement are invoked, and the majority of all banks have a post similar to a special control section which takes charge of handling these related duties exclusively. This particular work derives from the fact that a legal document seal alone is the only step to identify the customer himself or herself. We can say that there are great margins by which we may significantly "slim" such work, such as by adding a customer identification step which employs a driver's license or a health insurance certificate, and through such flexible philosophies increase bank transaction efficiency by using personal identification numbers. We may add that a strong sense of purpose in striving to achieve "slim work" by eliminating such unnecessary jobs can lead to opportunities for reconsidering current service regulations.

6. Concluding Comments on Methodologies

6.1 Relationship of the Three Approaches

In this study, we understood work as a structure consisting of an initial state and materials, final state and product, and then a basic transformation to convert the material into a product, and proposed three approaches: (1) Design work consisting solely of the basic transformation, (2) Discover the work steps corresponding to the basic transformation within the current work process, and eliminate all other steps, and (3) Analyze the role of the objects employed in the work process, and substitute different objects more suited to "slim work". These approaches may appropriately be position as (1) having inclinations toward the design approach, while (2) stronger tendencies toward the analytic approach in that it starts from the point of analyzing current work, and (3) is a mixture of these two.

Fig. 6 Conceptual Configuration of "Slim Work"

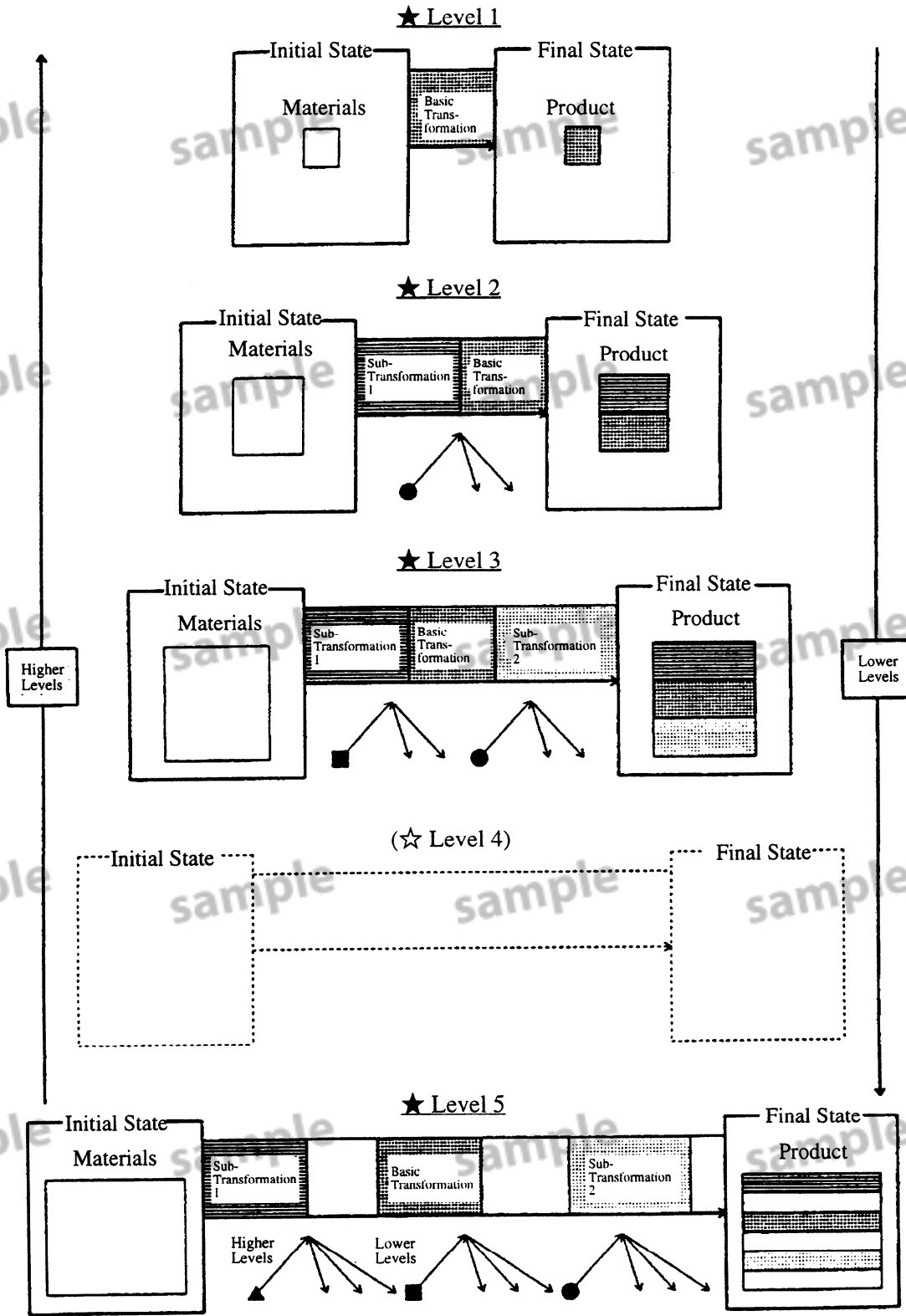


Fig. 6 shows the concept of “slim work” obtained by adopting these three approaches and the relationship between the three approaches. The symbols of ▲, ■, and ● represent the objects employed in the work steps. Level 5 corresponds to the present work situation, containing steps that do not create significant added value in transforming the materials into the product, and there are many expedient means used. In contrast, Level 1 shows work that consists solely of the basic transformation. If the relationship among the three approaches shown in this study is explained using this figure, it is possible to express (1) as a method which starts from Level 1 and attempts to rise to as high a level of work as possible, (2) as a method that aims to eliminate steps that do not bear added value and are expressed as empty white spaces in the Fig. 6 representation of Level 5, and (3) as a method where objects are expressed by ▲ and ■ wherein the roles of each are conceptualized as one thing in the process of rising to higher levels and separate things when they play roles in the approaching decline to lower levels.

When the above-mentioned arguments and discussions are carefully considered, however, the three types of approach conceptualize the methods for realizing “slim work” from different viewpoints, but all substantially refer to identical contents. For example, approach (1) copes with a conceptualization of work that eliminates as wasted all steps other than the basic transformation in the current work process. Also, the approach eliminating all extra jobs created by the objects used in the present work process is equivalent to the philosophy of eliminating all steps outside the basic transformation. Judging from this, it is possible to conclude that the underlying concepts for the methods proposed in this treatise are part of the attitude attempting to formulate a work concept that can come into existence only by clarifying the basic transformations within the work.

6.2 Future Topics for Discussion

The approaches proposed in this treatise are a condensation of basic ways of thinking and attitudes, and there remain several subjects for examination of the details of the work steps. Here, we would like to assemble the mere essentials concerning those topics.

In general, when analyzing the work process, how the partition between the beginning and the end is to be defined is a key issue. For instance, in the deposit withdrawal operations at the bank service window, if the final state is expanded to mean the state where a customer purchases something with the x yen withdrawn by the customer from his or her account, the basic transformation forming the work process will change, and this can cause ideas to be discovered; for example, when the bank pays for the purchase instead of the customer. In this way, it often becomes possible to obtain more effective substitute ideas when we broadly define the scope of the work, but in actual practice it is necessary to define these appropriately, taking into consideration the burden of the analysis work as well as the core issues and control of the work.

The problem of the level to which a product (or material) are to be described is yet another subject not dealt with in detail in this treatise. In the example cited here, the description of x yen could be upgraded to a fixed amount or sum exceeding a fixed amount. In that case, we can obtain ideas which differ from the ideas expressed in this treatise. Likewise, if cash is described as a payment step for instance, you may unearth the idea of

using a check for payment.

There is a problem of description method for the basic transformation as another subject closely related to the description level of the product. The basic transformation should be described as the function converting the material into the product, from the viewpoint of conceptualizing “slim work”, and disregarding the present work or the expedient means employed there. Therefore, it becomes more desirable to express, by way of example, the transformation “separate a sheet of paper” rather than phrase it as “cut a sheet of paper”. This is a very important point as a way of thinking, but in this treatise we explain that the description of the basic transformation referring to the present analysis is allowed from the viewpoint of application to reality (Refer to Remark 6). In that sense, we may say that the way of thinking is permitted to go somewhat counter to the theoretical strictness or rigidity of an idea called “basic transformation.”

What is more, it is hard to say that sufficient necessary guidance is provided to create ideas using the three individual approaches proposed. Especially, when designing the work consisting of only the basic transformation, we cannot deny the fact that we tend to depend on the abundance of ideas generated by the talents of individuals. While there is less value in pursuing safety, we believe it is essential that proper questionnaires and checklists be prepared, and arrange for future conceptualization aiming at creating a systematic method for use by anyone.

Moreover, we may be able to point out some points to be considered; such as the descriptive methods employing restrictive conditions, the methods for the evaluation of ideas or plans, and changes in the meaning of “slimness” in the situations to come. As a realistic approach to cope with this study, however, we feel that we should first firmly maintain a fundamental way of thinking followed by an orderly arrangement of all the detailed procedures, while increasing the number of applied cases.

7. CONCLUSION

In this treatise, we defined a change that must be made to obtain a product from a material as a basic transformation. With the idea that “slim work” is composed solely of this basic transformation, we then studied a method to design “slim work” made up of a simple procedure and less source to be invested for a recipient of service (customer) and a supply side. Subsequently, we proposed three approaches in a concrete manner, and confirmed the appropriateness and effectiveness of the contents by applying each of them to a bank service.

Improving work processes to fit the “slim work” definition is generally considered desirable in that it provides a source of time margins during job hours and leads to improved customer service for suppliers of materials and services as well as for users (customers). In fact, the banking industry cited as an example in this treatise is currently facing the need to compete with securities firms who were formerly considered to operating over the fence, as well as other financial institutions, in the wake of financial and monetary liberalization. It is necessary to sharpen our competitive edge by streamlining services to survive amidst the keen competition with rivals who are making the most of the advanced simplification of documents, etc. In such cases, there may be some people opposed to the “slim work” concept who are deeply involved

with the reevaluation of related laws and service regulations, who may raise the issue of recent cases of non-performing loans. However, a close examination of the situation reveals that these bad loans gone sour had occurred even when bound to the complicated procedures and strict inspection systems in the past. Under these circumstances, it is possible to affirm the necessity of exerting efforts toward achieving a definition of essential work through “slim work” and work and service improvement. Interest will be increasingly grow over the approaches to “slim work” operations amidst the situation where adverse pressure to reduce working hours is being applied along with imminently advancing internationalization and changes in social values. We hope that the approaches presented in this treatise will prove helpful to some degree in their universal application to numerous industries and occupations.

<Literature cited>

- [1] [Re-Engineering Revolution] by M. Hammer, J. Champie, translated by Ikujiro Nonaka, the Nihon Keizai Shimbun, 1993
- [2] [Solutions to IE problems 1 ~ 20] by Takeshi Kawase, IE Review, Vol. 31 No. 2, 1991 ~ Vol. 35 No. 1, 1994
- [3] [Proposed analytical work methods aimed formalization of the role of the objects that constitute work] by Shinji Shinoda and Akira Niwa, engineering report, Department of Technology, Seikei University, No. 44, 1987
- [4] [Development toward non-stock production method] by Shigeo Shingo, Japan Management Association, 1987
- [5] [Analysis of object and thing] by Zentaro Nakamura, Management Center, Japan Management Association, 1992
- [6] [Foundation of IE] by Akihisa Fujita, Kenhakusha, 1972

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