A Case-Based Support for the Process Modeling in BPR

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Abstract

This paper presents a knowledge-based methodology for business process reengineering that uses a case-based reasoning paradigm to assist its users in the modeling of a current problem and a redesign of critical business processes. As a process modeling tool for representing the business process, the Event-Process Chain (EPC) modeling method is used in this paper.

We developed a CAPMOSS (CAse-based Process MOdeling Supporting System) to support our proposed methodology. To reengineer a new business process problem, CAPMOSS retrieves from its case base the case that is most similar with the current problem. CAPMOSS uses a retrieved case to guide the structuring of AS-IS model and TO-BE model of a target business process. Using the transformational knowledge of a retrieved case, CAPMOSS helps the user to build an AS-IS model and TO-BE model for the target process with ease. And the purchase process in a government institute is explained as an application of this approach.

1. Introduction

Business organizations in the 1990s are facing the ever-increasing uncertainty and unprecedented volatility of the external environment. To cope with these environmental changes and uncertainties, organizational changes have been incorporated into the company for enhancing overall organizational effectiveness. The emergence of business process reengineering (BPR) has enhanced the organizational effectiveness in a competitive environment. However, BPR projects are considered a high-risk project due to their high management complexity, enterprise-wide impact, and steep project costs. Research on the BPR shows that these BPR attempts have not always been fruitful (Martinsons 1995).

A traditional approach recognized BPR as a general cognitive and heuristic process rather than a precise and formal one (Ku, Suh, and Tecuci 1996). Redesigning the business process or developing a new process from the previous one needs a heuristic knowledge that has been learned from similar BPR projects. For example, when the BPR team develops a redesigned process model for a target business process, they often find a similar business process and apply the best practices in the BPR project to it, and then repair it appropriately to meet the objectives of the target process. This implies that participants in BPR projects should have a heuristic knowledge for modeling current business processes and then redesigning a new process. Especially modeling a business process in the same domain makes it possible for this heuristic knowledge to be accumulated. Unfortunately there has been little research on using a heuristic knowledge for other new BPR projects. Ku, Suh, and Tecuci (1996) has suggested adopting a case-based reasoning approach to retrieve similar BPR projects for the current process. Even though they did not provide specific methodology in the adaptation process, their research tries to apply knowledge-based techniques to BPR. Yu and Mylopoulos (1996) suggested a systematic modeling framework for a knowledge representation of the business process. Their research works well in the design of a new process, but their methodology is hard in application to the different domains, and a computer-aided tool has not yet been developed.

This paper presents a knowledge-based methodology for BPR that uses a case-based reasoning (CBR) paradigm to assist its users in the modeling of a current problem and then redesigning a critical business processes. As a process modeling tool, the event-process chain (EPC) modeling method is used for representing the business process. EPC diagrams are easy to read and understand for end-users, managers, and BPR experts through the use of elegant abstraction mechanisms and a small number of modeling constructs (Kim 1995). To implement our proposed methodology, we developed a case-based process modeling supporting system, called CAPMOSS.

To reengineer a new business process problem, CAPMOSS retrieves from its case base the case that is most similar with the current problem. CAPMOSS uses a retrieved case to guide the structuring of a TO-BE model (i.e., redesigned model) of a target business process. Using the AS-IS model (i.e., pre-redesigned model), TO-BE model, and the transformational knowledge of a retrieved case, the BPR team builds an AS-IS model and a TO-BE model for the target process with more ease. The process modeling and redesign experience is also included in a tree-typed case base to facilitate the efficient retrieval of a relevant case afterwards.

The benefits of using CAPMOSS for process modeling is summarized as follows:

1. It reuses the transformational knowledge and experiences in performing the BPR.
2. CAPMOSS makes it easy for non-experts who have not actually performed the process modeling to perform BPR projects.
3. It reduces the risk of enacting the BPR plan through the development of several TO-BE models.

This paper is organized as follows. It begins with a brief review of BPR and then describes BPR as a knowledge engineering process. An EPC diagram as a process modeling tool for BPR is described. Next, it proposes CAPMOSS as a retrieving and redesigning support for BPR. The architecture and overall procedure for CAPMOSS with an illustrated example is described. Finally, it concludes with a summary along with some limitations, giving possible further research areas related to this paper.

2. Background

2.1 BPR as a knowledge engineering process

BPR is defined as the fundamental analysis and radical redesign of critical business processes in order to achieve dramatic improvements in costs, quality, and service (Hammer and Champy 1993). The heuristic knowledge or expertise of BPR is accumulated by hands-on experience in prior BPR projects. Many BPR teams are composed of one or two highly experienced managers or senior consultants and a staff of relatively inexperienced domain experts. To overcome this 'experience gap' and to improve the efficiency and effectiveness of their BPR teams, many organization are employing computer-aided tools such as CASE tools or simulation tools. However, these tools are helpful only within a limited scope and capability (Lee 1995). This paper develops a knowledge-based system that acts as an aid for inexperienced BPR participants to reengineer the business process using lots of prior knowledge. BPR is often started with a new vision from the top executives, and then followed by understanding the existing processes, and then designing and prototyping a new business process (Davenport 1993). Therefore, BPR activities involve identifying the existing processes, understanding those processes, and then developing better business processes.

In identifying the process, a BPR team makes a process vision, which is dependent upon the strategic goals of the company and its environment. Process vision describes the characteristics of the situation and environment of the BPR project. Therefore, we have to capture the general knowledge to make a successful BPR. General knowledge includes the purpose of BPR, the constraints of the project, the best-practice for benchmarking, and so on. In understanding the existing business process, a BPR team documents all existing processes before proceeding with innovations. They have to focus on "how" the value is transferred to customers. This is referred to as the domain knowledge that is disseminated from the end-user. Besides domain knowledge, other analytic knowledge is necessary like the BPR implementation skills, and the knowledge about process redesign. Several BPR gurus summoned that BPR had to start with a fundamental rethinking of all current processes and then develop a new system from scratch. Thus, any end-user feels a great difficulty in developing a redesigned alternative business process since most BPR efforts start the redesign from scratch. In real practice, the BPR team usually uses brainstorming for gathering creative ideas or benchmarks the prior successful BPR projects (i.e., best-practice). This BPR-related knowledge is usually disseminated from the BPR consultants who take a position with a knowledge engineer. Many experts such as BPR consultants and domain experts use their heuristic knowledge for these activities, which are necessary for an effective BPR. In these perspectives, BPR is required as a knowledge engineering process to make a new vision with the design of a new process. In this paper, we restricted the scope of knowledge engineering from modeling a current process (i.e., an AS-IS model), to only modeling a redesigned process (i.e., a TO-BE model).

2.2EPC modeling for BPR

BPR practitioners or participants have to understand the way people work together to achieve business objectives, generally with a view to make business processes more effective and efficient. The immature BPR-specific tools and methods in process analysis and implementation resulted in the failure of many BPR efforts (Martinsons 1995). The most important steps during the early stages of BPR is understanding the existing process, analyzing it, and then redesigning it. Traditionally, process modeling has been thought to be easy and useful for a BPR team to describe the facts of a business process (Curtis, Kellner, and Over 1992; Kim and Kim 1997; Davenport 1993).

There are a lot of methods for representing domain knowledge such as the descriptive way with procedural language or predicate calculus. But these methods have some limitations such as their difficulties for a non-expert to read or understand them along with too much when getting an overall view. We have employed the EPC (Event Process Chain) diagram to capture the domain knowledge in the form of a process model with the proposed methodology. EPC diagrams are reported to be well-suited in supporting BPR projects (Kim and Kim 1997).

An EPC diagram consists of just nodes and arcs, so it provides great simplicity in representing a business process in the knowledge based environment. An EPC diagram has four constructs: event, process, branching, and wait. With these constructs, it is possible to represent a core context for BPR where processes are frequently spread over functional boundaries (Kim 1995). An EPC diagram represents the organization's critical business processes over both geographical place as well as dynamic time dimensions, and exclusively from the customer's perspective. Through the elegant abstraction mechanisms and a small number of modeling constructs, EPC diagrams are easy to read and understand for end-users, management, as well as for IT (Information Technology) professionals. It also allows the BPR participants to investigate the details of the business process and to evaluate the performance of the AS-IS models and TO-BE models in the targeted business process. These characteristics of EPC diagrams with graphical representation help contribute to the acceptance of CAPMOSS as a process representation methodology.

An example of an EPC diagram is shown in Figure 6. CAPMOSS contains prior business process models, i.e., EPC diagrams in the same case base. Each case consists of EPC diagrams of an AS-IS model, along with those of a TO-BE model, and their corresponding transformational knowledge.

3. A Case-Based Process Modeling Support System: CAPMOSS

3.1 Architecture of CAPMOSS

CAPMOSS is developed to support our proposed methodology for process modeling, and to facilitate the BPR process using CBR as a reasoning mechanism. It consists of five main modules and a case base for storing prior BPR cases. The modules are User Interface, Situation-Specific Knowledge Interpreter, Case-Based Reasoning Engine, AS-IS Model Constructor, and TO-BE Model Constructor. Figure 1 shows the system architecture of CAPMOSS and the inter-relationships among these system components.

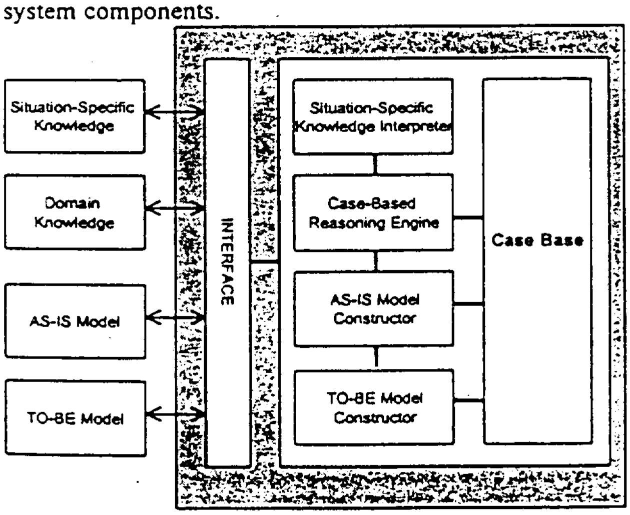

FIGURE 1. Architecture of CAPMOSS

The User Interface module provides interactive question and answering functions. It takes the user's understanding of a target business process in the form of situation-specific knowledge. It asks the user for specific information, presents the best-fit case, and finally shows the business process models (i.e., AS-IS model and TO-BE model).

The Situation-Specific Knowledge Interpreter transforms a user's understanding of the business process into a frame-form for retrieval of a similar case from its case base. The Case-Based Reasoning Engine selects a similar case in the case base. This module performs the following functions: searches for a similar case by navigating a hierarchical case tree within the case base, calculates the degree of similarity in selecting the relevant cases, maintains a list of relevant cases, and then presents the best-fit case to the model construction modules.

The Model Constructor module takes a relevant case and performs modeling actions using the retrieved case. In the designing of an AS-IS model, this module presents the content of a retrieved case to the user, in the form of frame-typed model descriptions along with AS-IS process models. The user can further develop an AS-IS model by requesting modifications of the AS-IS model of the best-fit case according to its own system through the User Interface. In designing a TO-BE model, the user performs a modification of the target business process through user interaction using the AS-IS model of the target business process, the TO-BE model, and the transformational knowledge of the retrieved best-fit case. A detailed description of the case base is explained at the next section.

3.2 Construction of case base

The first step in designing a case base is defining the case. Since a case is the representation of previously acquired knowledge that might be used in future case analysis, it is necessary for them to have a structure that allows them to be handled and accessed with relative ease. Each case is represented as a frame-based structure specifying the attributes and attribute values of the case (Kolodner 1993). For our purposes, a case is defined as a description of a BPR project at a specific point in time, so the key attributes that identify a case are these objectives and constraints in the BPR project. And the case also includes relevant information for BPR in the form of AS-IS model, TO-BE model, and transformational knowledge. Figure 2 shows the structure of a case with key attributes for identifying prior BPR projects and the redesigning of the target business process. In CAPMOSS, each case consists of three parts, situation-specific knowledge, domain knowledge with a set of EPC diagrams (e.g. AS-IS models and TO-BE models), and transformational knowledge, as shown in Figure 2. It has a hierarchical tree structure. Below the situation-specific knowledge, there are domain knowledge frames. A situation-specific knowledge have several AS-IS models. Each AS-IS model has a TO-BE model that is redesigned from the AS-IS model, and a set of transformational knowledge related to the change of process elements from the AS-IS model to the TO-BE model.

The situation-specific knowledge describes the circumstances of a specific BPR case. Business domain name, main process name, budget and time constraints, and specific objectives are an example of situation-specific knowledge. It roles as a meta-knowledge for differentiating each case. Therefore, searching similar BPR cases from the case base uses this knowledge. The domain knowledge describes the business processes in detail. Two types of models are included here: an As-Is model and a To-Be model. These two models are related to each other through the transformational knowledge. Finally, the transformational knowledge describes the heuristic expertise about redesigning an AS-IS model.

needs to search the related heuristic knowledge from the case base. To search a best-fit case of the target business process, the situation-specific knowledge base is well-structured in the form of a hierarchical tree.

3.4 Domain knowledge

The process-specific knowledge contains the context and constraints of the process. Process context specifies the types of the process, the process owner, the participants, and their activities in the process. Process constraints means the process design constraints such as domain-specific rules or regulations related to the target process context.

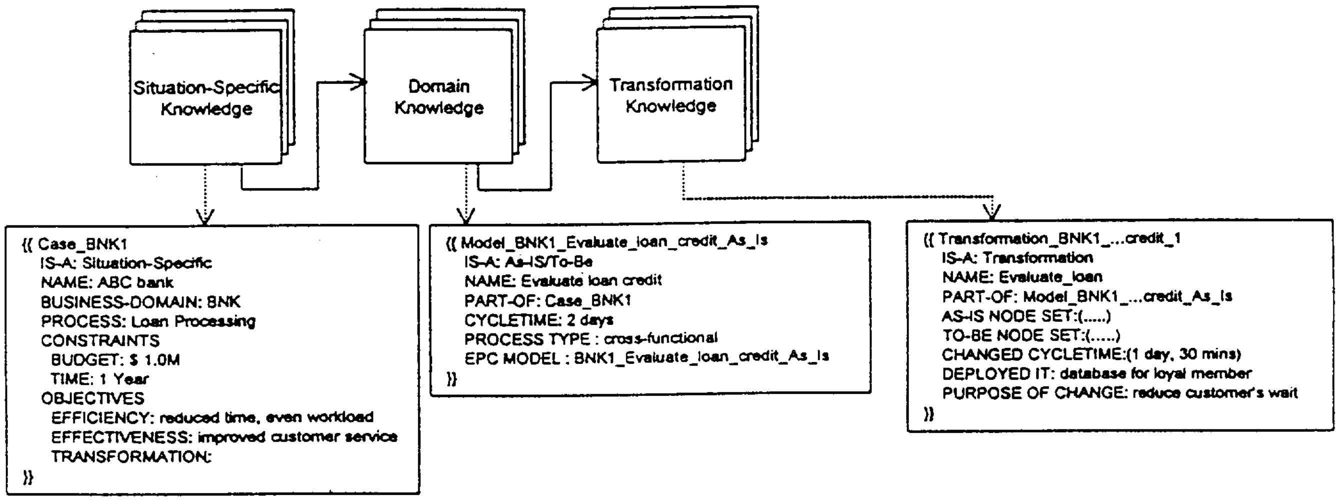

FIGURE 2. Structure and key attributes in case

CAPMOSS captures the characteristics of previous BPR projects that have been collected over time and uses them either to identify their type, or to solve a new BPR project. The bulk of its problem-solving knowledge is included in the case base.

3.3 Situation-specific knowledge

Each BPR case has a different circumstance with identifiable features or attributes. The situation-specific knowledge contains general knowledge about the BPR project, such as a business domain, specific processes, constraints, and objectives. Business domain describes the industry in which the company is involved. Specific process means the target business process which the BPR team redesigns. Financial budget of the project and project duration are used as constraints. CAPMOSS uses efficiency, effectiveness, and transformation as objectives for BPR projects. The specific measure of each objective is as follows: efficiency (reduced time, even workload, accurate transactions, less defects), effectiveness (improved customer service, improved relationships with both suppliers and customers), and transformation (business scope enlargement, business scope shifts). Since each BPR project has different situations, a BPR team

The BPR team can develop an AS-IS model of a target process by comparing the process constraints of the target process with those of the best-fit case. The violated constraints identify the roles and activities of the best-fit case that should be modified.

The EPC model provides great simplicity in representing business processes of a domain. It represents a part of the process context in the domain knowledge, along with participants and their activities in that process. It also allows the BPR teams to investigate the details of the business process with ease and to evaluate the performance of the AS-IS model and TO-BE model in the target business process. The remained parts of the domain knowledge are represented by the descriptive attribute-values.

3.5 Transformational knowledge

One of the most difficult tasks in a BPR project is creating an alternative business process, i.e., a TO-BE model. Transformational knowledge is represented as a frame-based structure specifying the attributes and attribute values of the case. Transformational knowledge includes details of the change, a deployed IT and applied redesign guidelines related to the AS-IS model and TO-BE model. It is represented by some descriptive ways, and it is dependent upon the BPR case. This knowledge allows the user to benchmark the prior BPR case and to redesign the targeted business process easily, even if the user has little experience about process modeling. Figure 8 shows some examples of transformational knowledge. It is also possible to use a part of the best-fit case of a problem instead of using the entire case. While an entire case may not be useful, some parts of a case may be required at the redesign phase. It facilitates the creation of new alternatives analogous to the prior BPR case.

4. Illustration of CAPMOSS

4.1 Overall procedure of CAPMOSS

The overall procedure of CAPMOSS is as follows: construction of a target business process, retrieval of a best-fit case based on situation-specific knowledge, construction of an AS-IS model, and finally the construction of a TO-BE model. Figure 3 depicts the overall procedure of process modeling through CAPMOSS.

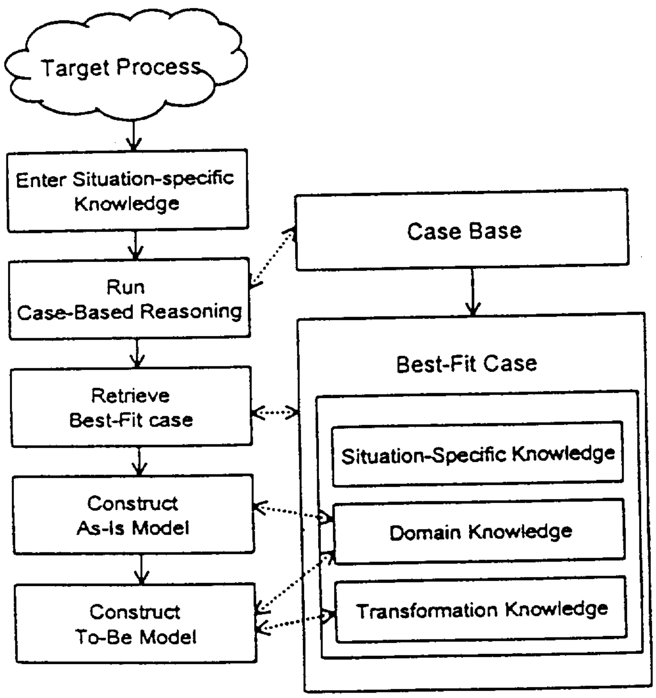

FIGURE 3. The overall procedure of process modeling through CAPMOSS

To model an AS-IS model of a new problem, the BPR team manually enters values of the situation-specific attributes to the system. CAPMOSS transforms the situation-specific values for the CBR engine. Once the target problem is interpreted into a case format, the CBR engine retrieves a best-fit case using search algorithms from the case base. The results of the retrieval process is a best-fit case, a set of process models (i.e. an AS-IS model and a TO-BE model), and a descriptive-typed transformational knowledge. Based on the best-fit case, we are able to develop the AS-IS model and the TO-BE model of the target process. If the system can not find any similar cases, it then asks the user to provide directly an AS-IS model, an EPC diagram for the target problem.

4.2 Retrieval of a best-fit case

The retrieval process has two phases in searching similar BPR cases for the current target process: a hierarchical tree search and a simple scoring method. First, a set of minimally similar cases is identified using situation-specific attribute values. Then those minimally similar cases are ranked using measured differences in their attribute-value content according to the objectives of BPR.

CAPMOSS classifies the set of past cases into a hierarchical structure with respect to three attributes: industry domain, BPR project budget, and BPR project duration constraint. Past cases having the same values in the three attributes are located in the same leaf node of the hierarchical tree. A target process is checked according to the three attributes, then it is classified into a predefined class. The cases in the predefined class which have the same values with the target process are called possible cases. After obtaining the possible cases from the case base, the system carries out a second search, considering three BPR objectives: efficiency, effectiveness, and transformation. A retrieval algorithm finds a case that matches as many objectives as the problem under consideration. For such a purpose, we established a similarity measure to determine the degree of similarity between two cases: The similarity measure is used to select, at the moment of retrieval, the case that has the greatest similarity value with the new case.

Let's explain this procedure using an example project case. This example is continually used for the following sections. In the example case, the target process is a purchasing process in a government R&D institute. The manager offers one million dollars as a project budget, and requires one year as the project's duration. And the manager expected that the BPR project would accomplish three objectives such as reduced time, even workload, and improved customer service.

Figure 4 shows two phased retrieval procedures of this example. It is assumed that four possible cases are extracted through phase 1. Using a simple scoring method the system we selects case 3 as a best-fit case. If the retrieval procedure had resulted in multiple cases with the same score, the BPR team could then select one solution as a best-fit case arbitrarily.

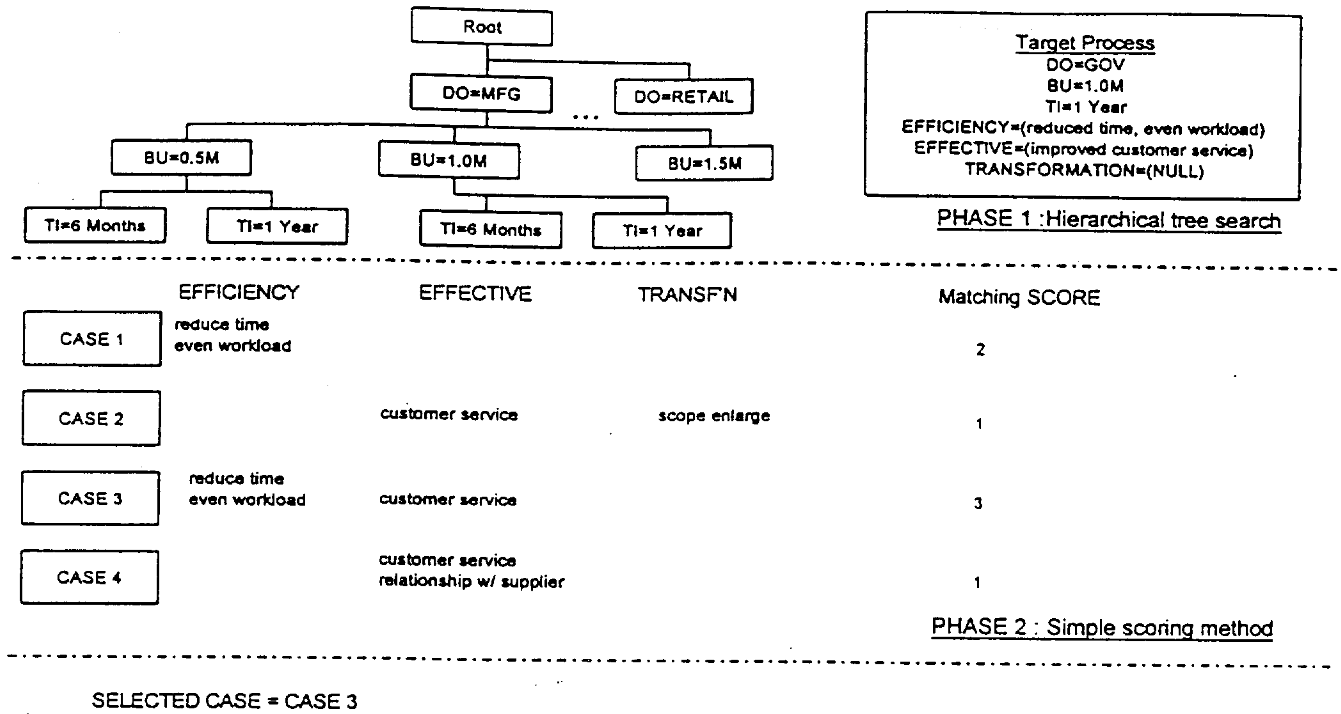

FIGURE 4. Two phases of the case retrieval

4.3 AS-IS model construction

Since the retrieved AS-IS model could not reflect all parts of the targeted business process correctly, it can not be reused directly. So an adaptation process is needed. An adaptation process is composed of two sub-steps: identifying the relevance of the best-fit case on the target process and then repairing the best-fit case for the target process. To identify the relevance of the retrieved AS-IS model in the best-fit case with that of the target situation, the system asks a user to check the similarity between the two business processes. The criteria for relevance checking are as follows: type of process, process owner, participants in the business process, and activities of each participant. CAPMOSS classified the type of process as within-functional, cross-functional, and cross-organizational. After the system gets the specific information, it calculates the degree of similarity between the retrieved AS-IS model and the user's answers. The degree of similarity is calculated as a weighted sum of scores with matched features as follows:

$$Sim = \sum_{i=1}^{n} (W \times S_i)$$

Where
W: Weight for each feature,
S_i: Score for the matched features.

We set the weight for each feature intuitively. For example, the feature "number of same places" has a larger weight value than the feature "number of same activities", since "place" is generally more important than "activity" as a process element in the process model.

Based on the AS-IS model of the best-fit case, the BPR team has to modify it according to the following steps.

Step 1. Identify the places involved in the target process.

Step 2. Identify activities (i.e., processes and events) in each place.

Step 3. Identify relationships (precedence and branches) between the activities.

Step 4. Draw the process according to the flow of the customer's requirements along with EPC diagram guidelines.

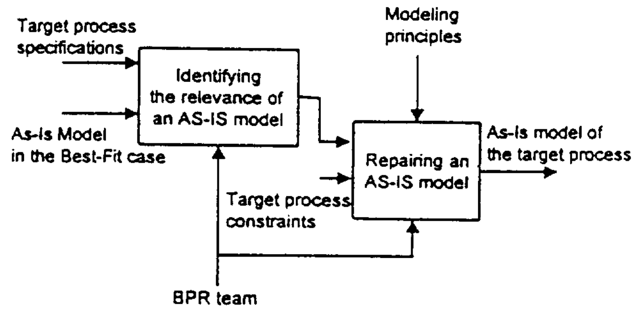

FIGURE 5. The process of AS-IS model construction

The AS-IS model construction process is usually not completed after a single cycle of the above steps. Even after completing an initial EPC diagram, the BPR team has to add further modeling constructs into the model, if new nodes and places are identified. To build an EPC diagram for the target process from that of the best-fit case, the following set of operations may be applied: adding new process design elements (e.g., place, node, flow, branch), substituting process design elements, and removing elements unrelated to the new process context from the retrieved model. To verify the proposed AS-IS model, CAPMOSS checks the process design constraints, such as domain-specific rules or regulations related to the modeling constructs in the context.

In our example, a purchasing process in a manufacturing firm is retrieved from the case base. The purchasing process in the government R&D institute is somewhat different from that in the manufacturing firm. In the government institute, each purchasing transaction requires a contract regulation process between suppliers and institute. The user adds the 'contract process' into the retrieved process model. Personnel in the purchasing department try to purchase the product at a lower price, therefore, they negotiate the price and delivery of the products with vendors whenever a purchasing transaction occurs. Since the incoming product along with its inspection occurs in the demand department in the government institute, the user changes the role of 'the receiving product process' in the retrieved model from receiving to the demand department. The following Figure 6 is the depiction of AS-IS model for the target process.

4.4 TO-BE model construction

Developing a TO-BE model from the AS-IS model is not an easy task since it requires a lot of experience and expertise in reengineering. CAPMOSS provides some support for the user in developing a TO-BE model. The end-user uses the transformational knowledge and the TO-BE model of the retrieved case to redesign the AS-IS model of the target business process. The basic idea of CAPMOSS in redesigning the target process is benchmarking the redesigned experiences from the retrieved case. If the retrieved process has a lot of similarity with the target process, the user will find it much easier to develop a TO-BE model.

The steps to redesign an AS-IS model are as follows. The first step is to measure the performance indicators of the target process. A BPR team makes the performance indicators according to the new process objectives. After the BPR team evaluates the performance gaps between activities of the target process along with the new process objectives, they then choose the most critical bottleneck points or the most influential nodes for redesign.

The next step is to identify those nodes in the AS-IS model that is also contained in the retrieved case. If the same node existed in the retrieved model, then the transformational knowledge of that node is deployed. And if the transformation is performed by information technology (IT), then identify nodes influenced by IT in

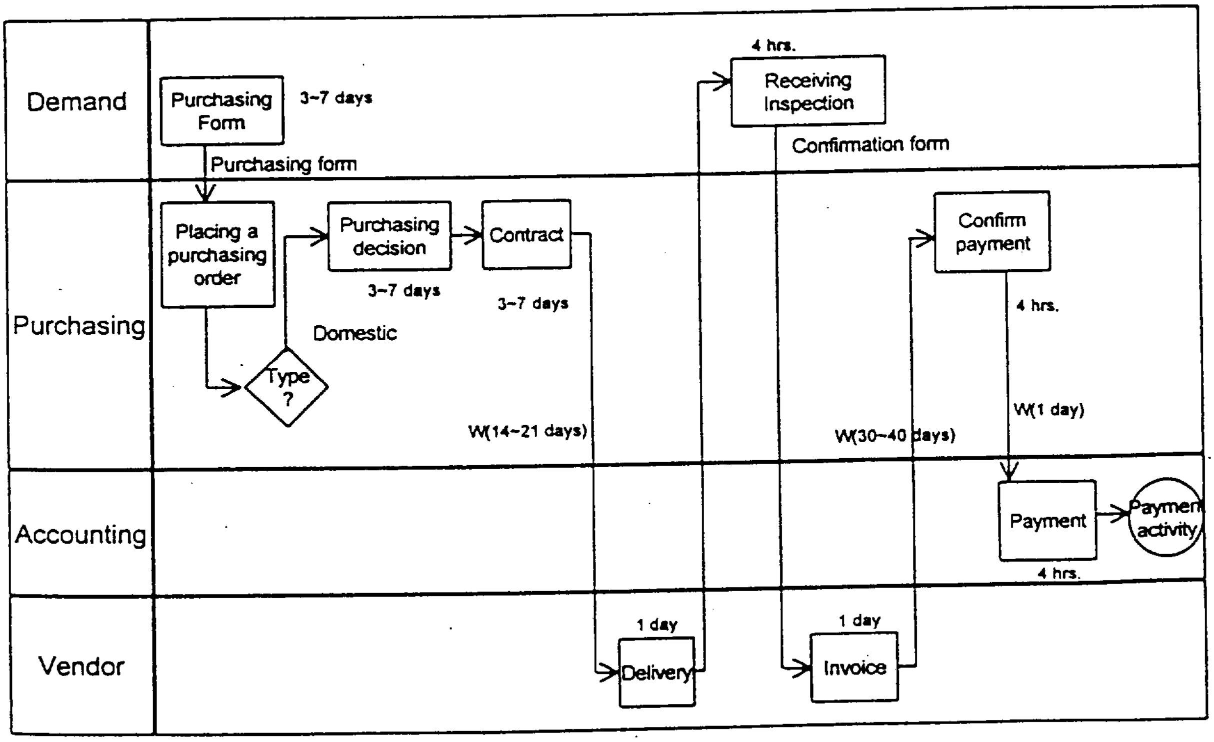

FIGURE 6. AS-IS model for the target process (Government R&D Institute)

the target process. The next step is to redesign the AS-IS model based on the transformational knowledge attached to the identified nodes, along with EPC diagram guidelines and the general BPR redesign guidelines. If a node in the target business process is different from the AS-IS model of the retrieved case, the system asks a user to justify the necessity of that particular node. If the justification for that node is a special assumption of the target organization, then identify an alternative means in the business process for substituting assumptions. Especially, if the cycle-time of the node is long, then it should be removed. The final step is to verify the redesigned model. Like the construction process of the AS-IS model, CAPMOSS repeated the above steps until the user is satisfied. Figure 7 depicts a TO-BE model construction process.

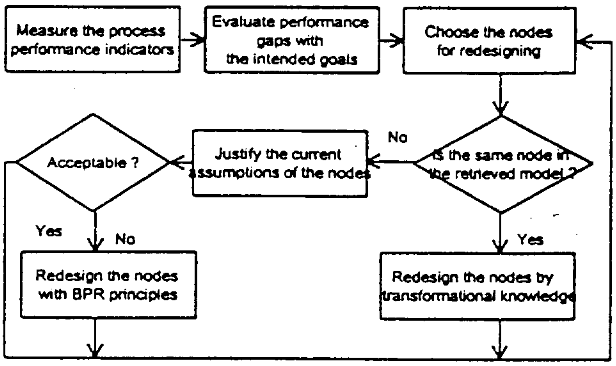

FIGURE 7. Flowchart of TO-BE model construction

In our example, the purchasing decision activity takes a long processing time in the government institute. All documents have often waited for transaction approval by the manager in the purchasing department. The BPR team compared an AS-IS model of the target process to that of the retrieved case. The PROCESS node " placing a purchase order" in PLACE "purchasing department" is also contained in two AS-IS models. The BPR team decided to transform the PROCESS node "placing a purchase order" by deploying the transformational knowledge related to that node. Using the transformational knowledge-1 of Figure 8, the PROCESS node "placing a purchasing order" can be changed to the EVENT node "placing a purchasing order". A real-time purchasing support system connected with vendors is deployed in the retrieved case since it reduces the cycle-time and also provides information sharing with vendors. Two of transformational knowledge are shown in Figure 8 as an illustrated example.

If the target process deploys the same IT, the influenced node is "purchasing decision", and "contract". The current assumption for "Purchasing decision" is that the purchasing decision task is a typical task for the purchasing department, and the purchasing department has an expertise in negotiating with vendors. But this assumption comes from bureaucratic thinking. In the advent of networking technology and IT, the demand department can also gather lots of information about vendors and products which they need. Since direct communication between user and vendor can reduce the frequency of information handover, the personnel at the demand department can select the right products and vendors they need.

Transformational knowledge-1
As-Is Node set : PROCESS(purchasing orders)
To-Be Node set : EVENT (placing purchasing orders)
Changed cycle-time : (10 days, 1 day)
Deployed technology: real-time purchasing supporting system
Purpose of change: reduce wait before in taking orders

Transformational knowledge-2
As-Is Node set : PROCESS(invoice), PROCESS (payments)
To-Be Node set : PROCESS(direct payments)
Changed cycle-time : (50 days, 2 days)
Deployed technology: supply chain management
Purpose of change: reduce the wait between invoice and payment and improve the relationship with suppliers

FIGURE 8. Examples of transformational knowledge

The current assumption of "Contract" is that since the target organization is a government institute, all transactions require a contract with written documents for future audits. A contract process takes a long time for obeying a user's correct requirements, checking its budget, and investigating its market. By introducing a long-term contract with a few reliable vendors, the targeted organization reduces the time for market surveys during each contract. With the purchasing support system, users deliver their product needs to vendors with greater ease. Since the system can check the budget of a user's department automatically, the vendors get fast payment for their product delivery.

Then BPR team decided to delegate purchasing decisions in its demand department, and to give them access to the purchasing supporting system. Through the offloading of the task of purchasing, they could reduce the cycle-time and also satisfy the requirements of the demand department. They redefined the tasks for the purchasing department such as market survey, controlling the prices for products, and so on. Receiving and inspection at the demand department is applicable in a redesigned model in the same way. The reason is that the sharing of information about both receiving and inspecting the products through IT removes the rework for physical inspection in the receiving department. It follows one of the Hammer's principles, " Capture information once and at the source". The payment process in this example is almost similar to that of retrieved case. Therefore the BPR team redesigned the payment process using the transformational knowledge-2. Figure 9 and Figure 10 show TO-BE models of the retrieved process (i.e., a manufacturing firm) and the target process (i.e., a government R&D institute).

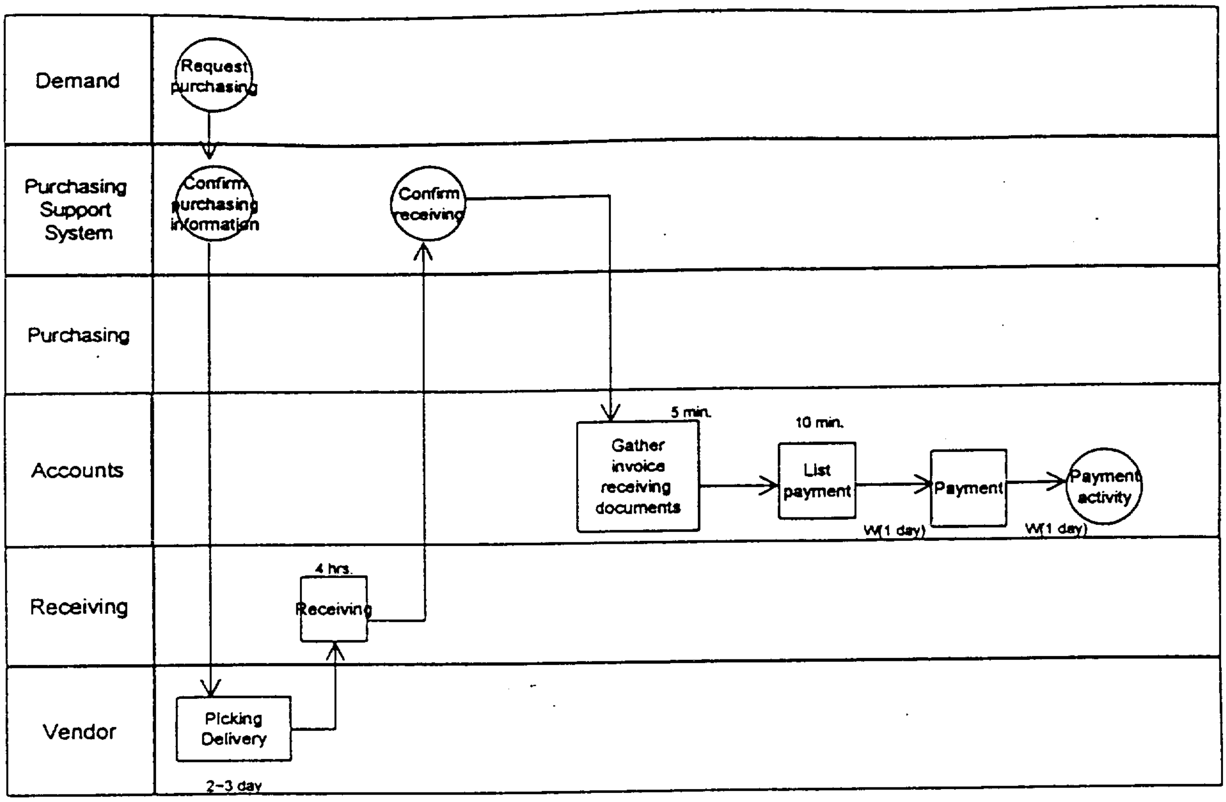

FIGURE 9. The TO-BE model of the retrieved case

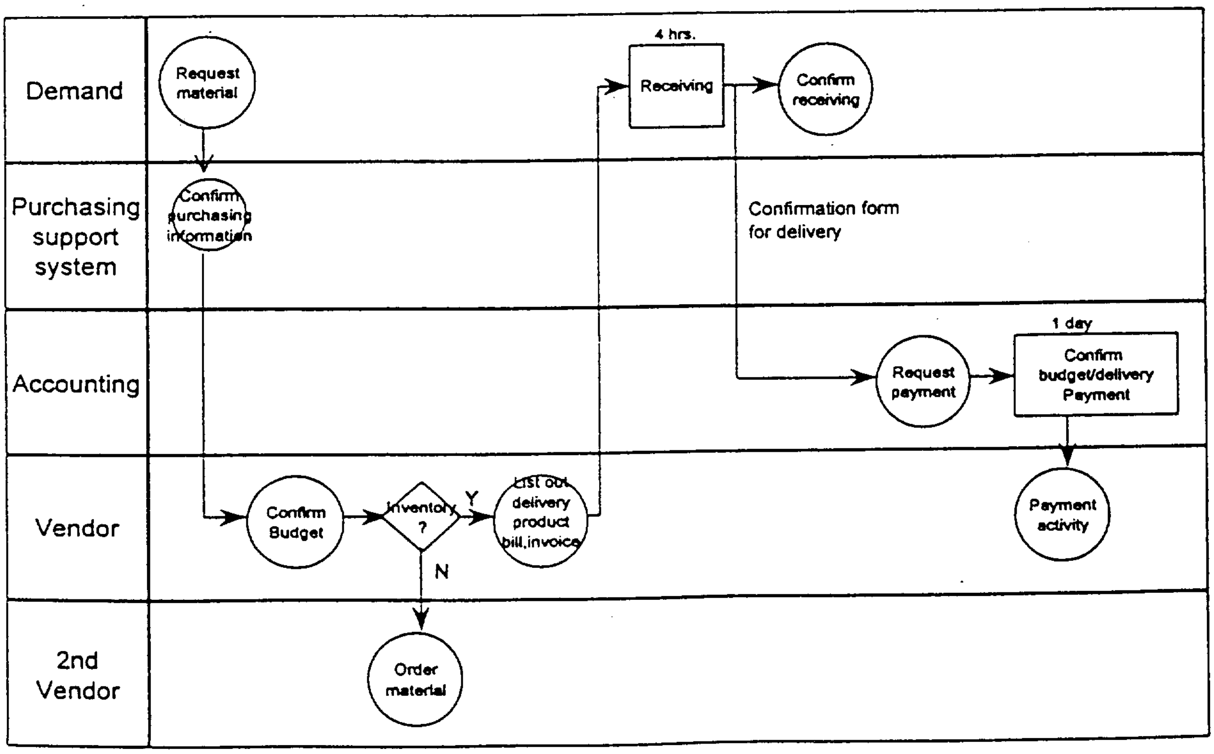

FIGURE 10. The TO-BE model of the target case

5. Conclusions

In this paper, we proposed CAPMOSS, a knowledge-based support system for enhancing process modeling in using a case-based reasoning methodology. Compared with other traditional supports for BPR, CAPMOSS focuses on the development of process models, AS-IS model and TO-BE model in using an EPC diagram. The aim of CAPMOSS is to reuse the past experiences of BPR project cases. For such a purpose, CAPMOSS retrieves a best-fit case according to the current BPR project, adapts the retrieved process model, and then develops the redesigned process model, i.e., the TO-BE model. The system is believed to provide the BPR team with great advantages in reducing project costs and risks. CAPMOSS is designed to be useful in different domains since it is a domain-independent system.

However, it has a few limitations yet to be solved. First, in the retrieval process, any other measures, such as the weighted sum, will be more helpful than our simple scoring method. Second, it is necessary to gather lots of real BPR cases in order to be a powerful application system. Designing a user interface user-friendlier is a promising further research area since CAPMOSS adapts an EPC diagram. It is also necessary to perform a validation test after enough cases are gathered.

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