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The Business Process Investigation in the Perspective of Customer Value

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ABSTRACT

To identify the customer value provided from the business process and to seek additional opportunities to fortify a firm's competitive advantages, we explore the value chain mentioned in (Porter, 1985) at a greater extent. The study results in a framework where an information-processing infrastructure is added to the value chain concept to provide a basis for the business process investigation. The essential concept of this framework is the **process-wide information organism (PWIO)** approach for describing and examining mechanisms of managing the information flow that contributes to customer value creation.

Keywords: process investigation, customer value, value chain, linkage.

1. THE PROCESS MANAGEMENT AND THE VALUE CHAIN CONCEPT

A business process consists of a series of related business tasks to be performed. An ordering process and a transaction-based revenue cycle are commonly seen business processes. Business processes create and deliver a value proposition for customers through the (value-added) product or service¹. Thus, the performance of business processes is a leading indicator of subsequent improvements in (customer) value and financial outcomes. To well manage business processes and to seek (additional) opportunities to fortify a firm's competitive advantages are important issues nowadays.

In the literature, there are many studies of (business) process analyses. In terms of describing and analyzing processes, these studies can be grouped based on two distinct viewpoints for different targeted readers: one focuses on the technique issues and the targeted readers are engineers (for example, the IDEF0), and the other talks about a firm's strategy and the targeted readers are executives (for example, the value chain concept). Each viewpoint has its predicaments.

More specifically, the Process Management (PM) method suggested in (Elzinga, *et al.*, 1995; Stefano and Giovanni, 2003) is set out in the following six basic stages:

- (1) *Preparation*. Defining the crucial factors for business success and a firm's basic strategic targets; designing the organization structure (for example, steering committee, PM teams, etc.) for PM.
- (2) *Process selection*. Identifying the process to be analyzed and improved.
- (3) *Description*. Agreeing on a common definition of the process by documenting workflows.

(4) *Quantification*. Defining the process in terms of cost, quality and time performance.

(5) *Selecting improvement opportunities* based on acquired knowledge of the process, information about the crucial factors for business success, and of company targets.

(6) *Implementing improvements* that have been identified.

The cycle can be repeated downstream of the improved process, in order both to select new processes and to seek further improvement opportunities within the same process. Integration Definition for Function Modeling (IDEF0) stated in (Sandie, 1997) can serve stages of *Description*, *Quantification* and *Selecting improvement opportunities* of the PM method. IDEF0 is a model used to present structured information about the functions performed by an organization and has been proposed to analyze and identify process improvement opportunities. In addition, simulation modeling proposed in (Hlupic and Robinson, 1998) could offer great potential in analyzing business processes through dynamically modeling different samples of parameter values such as arrival rates or service intervals which can help in discovering process bottlenecks and investigating suitable alternatives. Some drawbacks in IDEF0 and simulation modeling are the excessive usage of technique and the inability to simplify the analysis.

On the other hand, some studies claimed that business process analyses should be based upon the customer value and a firm's strategic viewpoint. For instance, Porter (1985) stated that the issue should be the value, the amount customers are willing to pay for what a firm provides them. To discover a firm's competitive advantages, Porter proposed the value chain concept to analyze buyers, suppliers and a firm via disaggregating them into discrete but interrelated activities from which (customer) value stems. Furthermore, Kaplan and Norton

¹ Such service includes the ones for internal and external customers.

(2001) observed that organizations focusing on strategy and customer value tend to be more successful. With a clear picture of business direction and customer value propositions, organizations can deploy (or redirect) its resources at implementing strategy initiatives. In addition, the availability of knowledge of information system infrastructure and applications that align information capital to the strategic business processes is nowadays required to support the implementing strategy initiatives. As such, the expected outcomes are more attainable. Unfortunately, these studies did not release any solid methodology for examining the customer value delivered from the business process.

For instance, each value chain in Porter (1985) was designed to fulfill a set of value-adding activities. Across activities, there are linkages where information flows allow *optimization* or *coordination* to take place. Linkages are “relationships between the way one value activity is performed and the cost or performance of another.” (Page 48) However, Porter stated that it is much more difficult to recognize and manage linkages than managing value activities themselves, and the ability to recognize and manage linkages “yields a sustainable source of competitive advantage.” (Page 50) Without a solid knowledge for recognizing and managing linkages, it is difficult to effectively examine the customer value provided from the business process that covers a subset of activities.

These unsolved predicaments motivate this study. This study tries to explore the customer value delivered through the business process. For such an exploration, this research proposes a framework where an information-processing infrastructure is added to the value chain concept to provide a basis for the business process investigation. The essential concept of this framework is the **process-wide information organism** (PWIO) approach for describing and examining mechanisms of managing the information flow that contributes to customer value creation.

In the following sections, we will first introduce the PWIO approach, followed by the presentation of the business process analytical methodology. Promising managerial applications and future work are given in the last section.

2. THE PROCESS-WIDE INFORMATION ORGANISM (PWIO) APPROACH

Every firm maintains a variety of groups of functionally interrelated contact points (CPs) which work together for performing activities of the value chain mentioned in (Porter, 1985). The value chain concept is proposed to analyze activities a firm performs, and how these activities interact to procure competitive advantage. After receiving request for service from other (intra- or inter-organizational) activities, each activity plays the dual role as a server of value-adding provider (executing

business tasks for the client) and, if necessary, as a client (releasing information for asking for support from other activities). In other words, there are two kinds of information-processing infrastructures practiced in performing a business task: (1) CPs to process information and conduct the corresponding business task, and (2) information channels (ICs) to carry the information flow.

The practice of each CP processes information and undertakes business tasks for value-adding. In the CP, there are mechanisms capable of (1) receiving the information delivered from other CPs, (2) executing business tasks based upon the received information, (3) feeding back the corresponding information, and/or (4) releasing information to the supporting CPs. Between two different CPs, a client and a server, the (intra- or inter-activity's) information flow should pass forward or backward through the IC seamlessly to request or provide a service. Thus, each CP accompanies with the inbound and outbound ICs for carrying the in-coming and out-going information, respectively.

Hereby, a business process consists of a series of related business tasks that the practice of a group of functionally well-connected CP/IC is designated to perform.

In practice, a staff, an ad hoc team, or an information system could act as the practice of a CP. And a memo, a post mail, a phone call, a face-to-face meeting, a teleconference meeting, an intra net, an email, a (beeper or wireless) message, or a web information system could act as the practice of an IC. Furthermore, there may be multiple practices of a CP/IC. In brief, the practice of the CP/IC is in one of the following forms: manual, automatic, or parallel (have both manual and automatic practices simultaneously).

The practice of each CP/IC should create value (in the form of lower costs or improved performance) for the client CP. Difference in practice of a CP delivers various level of quality of coping with the corresponding business task, which differentiates the outcomes of its value-adding. For instance, an experienced manager can deal with unexpected business scenarios better than a decision support system and a junior manager. Difference in practice of an IC also differentiates the outcomes of the associated CP's value-adding. For instance, a phone line at a time epoch can serve only one customer, but the audience served by an Enterprise Information Portal at any time epoch may be more than one. The costs associated with different practices of each CP/IC may vary as well.

The discussion of the ICs explores the identification and management of linkages among value activities because, as mentioned in Porter (1985), exploiting linkages requires information or information flow which allows optimization or coordination to take place. Each IC identifies the existence of a linkage between two CPs,

and to identify the degree of integration of CP/IC is to explore the management of linkages. A better integration of CP and IC can render a better optimization or coordination happened in the information flow to leverage linkages between (value) activities. For instance, a firm provides an email practice in the (outbound) IC to customers, but some customers are incapable of receiving emails. In other words, practices of this very (inbound/outbound) IC between two CPs are asymmetric. The asymmetry existing in practices of the (inbound/outbound) IC between two CPs would impede the effectiveness of communication, the performance of the task, and thus the corresponding customer value.

The collective quality of information and the smoothness of the information flow associated with a business process are determined by the practices of all involved CP/ICs. The higher the degree of the collective quality and smoothness of information flow is underlying a business process, the larger the value a company can derive from these connected CP/ICs. However, a poor practice of an individual CP deteriorates the collective quality of information and the smoothness of the information flow in a business process.

The PWIO of a firm embodies all practices of all CP/ICs of a business process. Business processes that are critical to business success are expected to proactively responsive to the dynamic business environment. As such, each group of functionally well-connected CP/IC is adaptive in term of its functionality and practice. This adaptation leads to an analog between the PWIO and an organ in the living body.

Collectively, a firm maintains a PWIO for a business process. Via the practices on all CP/ICs in the PWIO, the firm handles not only the corresponding (transaction and non-transaction) information flow, but also performs all the involved business tasks. Furthermore, a firm uses its PWIO to do all the involved business tasks in a whole, not separately, for doing business. Whether a firm has a good performance in the (decisive) business process in value-adding for its customers depends on how well it manages the corresponding practices of CP/ICs of the associated PWIO.

In closing, the PWIO approach stems from the value chain concept and provides a solid description of the business process without too-much technique.

3. THE BUSINESS PROCESS ANALYTICAL METHODOLOGY

The proposed business process analytical methodology basically follows the first four stages of the PM method. Executives practicing the art of strategy must identify the decisive business processes that are the most essential for creating and delivering the differentiating customer value propositions. And the identification should be aligned with the vision of the firm. The revenue cycle, for

instance, is a decisive business process.

For each decisive business process, the following steps are proposed for accomplishing stages of *Description* and *Quantification* of the PM method: (1) to develop the corresponding business process table, (2) to develop the associated practice tables, (3) to complete the performance measures of CP/IC shown in practice tables, and (4) to integrate the summarized performance measures derived at the step (3) into the decisive business process table. The detail of each step is presented below.

(1) Developing the business process table: There are four columns in a business process table: responsibilities, functions, objectives, and performance measures. At the current step, only the responsibilities and functions columns are determined and filled in.

(2) Developing the associated practice tables: The practice table is to explore the practices on all associated CP/ICs for each function listed in the business process table. There are seven columns in the practice table: the practice of the associated CP, the job requirement of the CP, the practice of the associated inbound IC, the job requirement of the inbound IC, the practice of the associated outbound IC, the job requirement of the outbound IC, and the associated objectives and performance measures. At the current step, except the column of the associated objectives and performance measures, all the other six columns are determined and filled in. The corresponding practice of the other connected CP is shown in the parenthesis. The redundant CP/ICs and less important CP/ICs should be omitted.

(3) Completing the performance measures of CP/IC shown in all practice tables: Management cannot take place if the object needed to be managing cannot be measured. The measurement however would be impossible without a good description of the object. Therefore, for each practice table, we first determine and fill in the associated objectives of CP/IC, and then assign the performance measures correspondingly.

In each practice table, only the summarized performance measures are listed, and there are no detailed performance measures, the ones corresponding to the connected CP. For instance, when the CP in the sales department asks the corresponding CP in the production division for the backing up order information, the summarized performance measure is the process time of asking backing up order, and the detailed performance measures are process times of checking production schedule (performed by the CP responsible for production scheduling) and raw materials (performed by the CP responsible for raw materials warehousing).

(4) Integrating objectives and summarized performance measures associated with all practice tables into the columns of objectives and performance measures

appeared in the business process table, respectively.

In brief, the former two steps correspond to the stage of *Description* via following the PWIO approach presented in Section 2. The latter two steps correspond to the stage of *Quantification* of the PM method. In the literature, there are bodies of performance measures that we can borrow from for accomplishing the step 3. For instance, we can reference the measures of IT/IS's profitability, productivity and customer value (cf. Hitt and Brynjolfsson, 1996; Laudon and Laudon, 2000, pp. 353-360; Devaraj and Kohli, 2002, pp. 6-8; DeLone and McLean, 2003) to get the candidate performance measures of the practice of each automatic CP/IC. The candidate performance measures include, but not restricted to, an amount of errors, severity of errors, response time (process time), rate of tasks performed, the reduction in process/search costs, sales growth, market share, customer satisfaction/loyalty (repeat purchases), old customer retention, new customer acquisition (growth in new sales), and customer profitability contribution. There are also references in the human resources (cf. Bohlander, Snell, and Sherman, 2001), for the measure of the practice of manual CP/IC. But to measure the practice of manual CP/IC is much more difficult than to measure the practice of automatic CP/IC since the former involves not only the productivity and the profitability, but also the personality, including intelligence, experience, creativity, and (sometimes) ambition. A simplest way is to adopt the same candidate performance measures to both automatic and manual CP/IC.

Table 1 gives the illustration of a business process table corresponding to the revenue cycle of a specific firm² and Figure 1 gives the corresponding depiction. Tables 2 and 3 give the illustration of practice tables for functions of developing new customers and asking for backing up order shown in Table 1, respectively. In Figure 1, the parenthesis shows the corresponding practice of the connected CP.

4. PROMISING MANAGERIAL APPLICATIONS OF THE PWIO AND FUTURE WORK

Business objectives and performance measures are rather common to all companies for planning, controlling, and performance evaluation purposes. However, the

alignment of objectives and performance measures without targeting at business direction could be detrimental to organizational performance (Kaplan and Norton, 1997). Thus the development of objectives and measures should depend on business direction/strategy of the firm. As the proposed business process analytical methodology is based on exploration of information flow underlying value chain activities, the business direction, building up customer value, is clear. With the clear business direction, a strong coherence of process objectives and performance measures buttresses implementations of customer value-oriented business processes. In this perspective, the analysis resulted from the PWIO approach helps the analysis of the implementation of business strategy.

It is worthy of noting that, for carrying the information, the practice of IC alone is always a necessity in the business environment, and nowadays gradually becomes a utility that is rather irrelevant to the competitive advantage. Furthermore, since the effectiveness of the integration CP/IC and thus quality of business processes determine how value get created and sustained, the proposed business process analytical methodology provides a venue to the business process evaluation.

Some knowledge extended from the PWIO approach, for example, the one in Figures 1, also depicts the level of integration of practices of CP/IC in forms of manual, automatic, or parallel. The automatic practices of CP/ICs correspond to the information system infrastructure and applications. In a sense, the information systems evaluation can be done implicitly via examining the extent and the importance of the corresponding automatic practices of CP/ICs in the whole (decisive) business process. Thus, the PWIO approach also provides a means of obtaining the knowledge of information system infrastructure and applications that align information capital to the strategic business processes. A future work is to strengthen such a sense and complete the associated studies.

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² The study of this revenue cycle is based upon the case study of a project sponsored by Institute for Information Industry, Taiwan, China. For details of all practice tables please send a request to the corresponding author.

Table 1: The business process table for revenue cycle of some firm

Responsibility	Function	Objectives	Performance Measure
1. Developing and contact customers	1-1. develop new customers 1-2. contact customers	<ul style="list-style-type: none"> • develop new customers and new sales • prompt response • increase customer satisfaction 	<p>growth in new sales</p> <p>response time</p> <p>customer satisfaction</p>
2. Processing sales order	2-1. take order 2-2. approve credit 2-3. check inventory availability 2-4. ask for backing up order 2-5. approve / reject order	<ul style="list-style-type: none"> • prompt in taking order • reduce process time of approving credit • reduce process time of checking material • reduce process time of checking product availability • prompt in checking backing up order • precision in taking order • precision in inventory record • accuracy in raw material record 	<p>process time of taking order</p> <p>process time of approving credit</p> <p>process time of checking material</p> <p>process time of checking inventory availability</p> <p>process time of checking backing up order</p> <p>error in taking order</p> <p>error in inventory record</p> <p>error in raw material record</p>
3. Picking, packing & shipping	3-1. pick& pack products 3-2. ship products	<ul style="list-style-type: none"> • prompt in preparing for shipping • precision in picking & packing order • accuracy in invoicing & shipping 	<p>cycle time for preparing for shipping</p> <p>error in picking& packing order</p> <p>error in invoice & shipping</p>
. Billing & maintaining accounts	4-1. update accounts 4-2. bill	<ul style="list-style-type: none"> • timely update customers' credit record • reduce process time of inquiring credit • screen customers with bad credit • accuracy in customers accounts • precision in billing 	<p>interval of updating credit record</p> <p>process time of inquiring credit</p> <p>amount of bad debts</p> <p>error in customers accounts</p> <p>billing errors</p>
5. Collecting cash	5-1. remit & deposit	<ul style="list-style-type: none"> • timely collection of account receivables 	<p>account receivable turn over</p>

Table 2: The Practice table for developing new customers

Practice of the CP	Job requirement of the CP	Practice of the inbound IC	Job requirements of the inbound IC	Practice of the outbound IC	Job requirement of the outbound IC	Objectives (Measures)
Salespeople in Sales Unit 1 of Sales department	develop new customers in Taiwan	teleconference meeting, mail, phone call (from CEO or secretary of CEO)	bring in information			develop new customers and Increase rate of customers acquisition (rate of customers acquisition)
Salespeople in Sales Unit 2 of Sales department	develop new customers in Mainland China					
Salespeople in Sales Unit 3 of Sales department	develop new customers in other area					

Table 3: The Practice table for Asking for backing up order in Sales

Practice of the CP	Job requirement of the CP	Practice of the inbound IC	Job requirement of the inbound IC	Practice of the outbound IC	Job requirement of the outbound IC	Objectives (Measures)
assistants in sale-supporting Unit of Sales department	ask the Warehousing department and Production department for backing up order. If the due date cannot be made, then acknowledge customer the new due date.	<ul style="list-style-type: none"> • ERP information system (from raw material inventory information system in Warehousing department) • ERP information system (from production management information system in Production department) 	bring in the result of backing up order (from Warehousing department and Production department)	<ul style="list-style-type: none"> • ERP information system (to raw material inventory information system in Warehousing department) • ERP information system (to production management information system in Production department) • phone call, email (to customers) 	<ul style="list-style-type: none"> • deliver the asking for backing up order (to Warehousing department and Production department) • acknowledgement of whether the production is necessary (to customers) 	<ul style="list-style-type: none"> • reduce the process time of asking for backing up order (process time of asking for backing up order) • reduce the process time of checking raw material (process time of checking raw material)

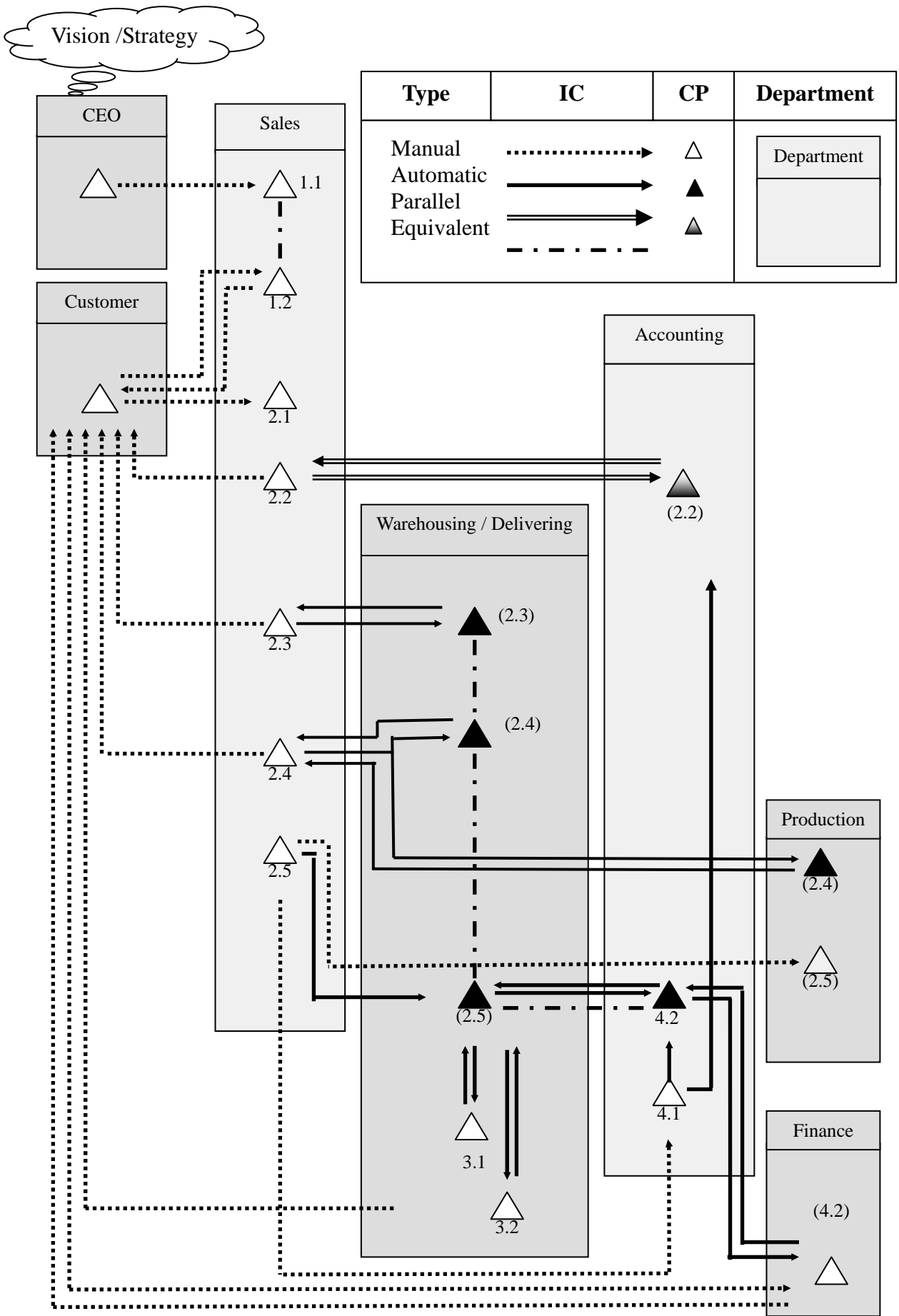


Figure 1: A graphical illustration of the CP/IC deployment in the revenue cycle shown in Table 1 derived from the PWIO approach.

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