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A web-based architecture for implementing electronic procurement in military organisations

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Abstract

In recent years, the vital development of the Internet offers increasing opportunity for electronic commerce. E-commerce attracts much attention from enterprises, not only to get connection with others and make a profit from their product/service, but also to reduce the costs of internal and external operational procedures. Procurement is a very critical task because it is a matter not only of making a profit, but also of staying in business in a highly competitive environment. In the government sector, procurement is sometimes the source of corruption, scandal and abuse of public resources. Besides inadequately qualified personnel, “transparency” of the procurement environment becomes another source of problems in procurement procedure. This paper investigates a case study of e-commerce in the Taiwanese military organization by diagnosing and preventing procurement faults, constructing a transparent procurement environment, and enhancing military procurement efficiency, and is an attempt to establish an e-market environment via web-based architecture on e-procurement procedure. The design of a relational database is introduced and system implementation is presented. Also, efficiency and benefits of the proposed system are discussed.

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1. Introduction

To maintain the national defense, the government of Taiwan spends a large amount every year to acquire new weapons and military materials. For example, military procurement funding reached US\$2.5 billion in the year 2000 (National Defense Report, 2000). In order to avoid corrupt practices, procurement must be conducted by operational procedures (Government Procurement Law, 1998). However, on December 6, 1993, the death of a Naval colonel exposed not only a US\$2.5 billion Lafayette-class frigate procurement scandal, but also turned an originally simple procurement case into an internationally complicated political incident, which revealed serious problems in military procurement in Taiwan. Thereafter, the military in Taiwan has taken a series of reform measures, including the reorganization of its pro-

urement system and organization, educational training for buyers, and the amendment of procurement regulations.

In recent years, use of the Internet and e-commerce has subverted the traditional way of running business, thoroughly changed the channel of enterprise transactions and influenced the majority of enterprises (Shaw et al., 1997). Technology performance has shortened transaction time and lowered costs, enabling enterprises and individuals to possess the capabilities to quickly react the change in global business development (Zhang, 2000). E-commerce uses communication networks to share enterprise information, maintain enterprise relations, and conduct enterprise transactions (Zwass, 1996), and is a modern way for enterprises to satisfy the needs of customers to increase the qualities of products and services so as to expedite delivery service flows. Meanwhile, e-commerce plays the role of a medium to convert digital input into value-added output (Kalakota and Whinston, 1997). Therefore, commodity and service activities performed by means of electronic communication are commonly regarded as e-commerce (NIST,

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1999), which can be divided into five areas: enterprise resource planning, global e-commerce architecture, supply chain management, channel linkage, and customer relationship management. The supply chain comprises product sources, product information collection, procurement flow management, supplier management and account payable management.

From the standpoint of economics, information technology (IT) can be applied to integrate two value-added activities; one is the Electronic Market and the other is the Electronic Hierarchy (Malone et al., 1989). The so-called electronic market provides buyers and sellers with a multi-organizational information system to exchange price and product information (Bakos, 1990) Through an electronic market, buyers and suppliers have less reliance on brokers and have more opportunities to choose their potential partners or to cut costs during the process of selecting products (Malone et al., 1989). An e-market can also help customers to reduce the cost of acquiring the price and product information they need and choosing different suppliers, and also to reduce the cost of conveying product characteristics and price information to customers. An e-market changes enterprise organizations, and its development increases its effect on the structure of organizations (Strader and Shaw, 1997). In pursuit of potential interests, enterprises will progressively develop from the integration of the minority Internet and inter-organizational exploitation to the limited selective local integration, and then to the full local integration (Poon, 1997). Currently, some research papers concerning the application of e-market instances into governments and enterprises have been issued (Heezen and Baets, 1996; Zimmermann, 1997; Goh and Lau, 1998; Leidner, 1999; Määttä and Pesonen, 2000; Zhang, 2000).

As procurements by military organizations proceed, the popularity of e-commerce has provided new ways of structuring that process. In the past, procurements by military organizations in Taiwan were conducted by clerical operations, which, due to the shortage of qualified personnel or the lack of legal and moral restrictions, were subject to irrational individual bias factors. Therefore, human deficiencies and faults easily led to corrupt practices. This paper investigates the problems with the current military procurement operations and proposes solutions to these problems. First, this research presents documents from 1993 to 1998 concerning the reclamation and impeachment proposed by Control Yuan against the military procurement scandals of the Ministry of National Defense (MND). These data are analyzed and the problems are classified. Then, in that light, current military procurement procedures are discussed so as to seek problems in military procurement operations and put forward the architecture of the digital procurement procedures. Second, the theory of e-commerce is implemented into the military procurement operations,

and an e-commerce Business-to-Business (B to B) model, together with a web-based architecture, are integrated to build an e-procurement system for procurement procedure. The e-procurement system is expected to provide an effective e-market environment and more channels for military procurement, to streamline military procurement procedures, make the bidding more transparent, and reduce the cost of procurement transactions and military material acquisition. By doing so, efficiency in procurement could be increased and corrupt practices could be decreased. Finally, related knowledge concluded from this paper is presented for discussion and conclusion.

2. Military procurement in Taiwan

2.1. Hierarchy of the military procurement organizations

The procurement bureau of the MND, charged with the authority for military procurement in Taiwan, has seven subordinate first-class military organizations including the HQs of the Army, the Navy, the Air force, the Logistics, the Military Police, the Coastal Patrol and the Chung-Shan Institute of Science and Technology (Fig. 1). Each of them has its own procurement department in charge of their own procurement affairs. The amount of the procurement budget determines what military organizations are in charge of the procurement works. Currently, any procurement transaction more than US\$1 million is charged to the procurement bureau of the MND, while those less than US\$1 million are charged to the MND's subordinate first-class military organizations. This paper is directed at the procurement operations conducted by the MND.

2.2. The military procurement operational procedures

In Taiwan, both the MND and its subordinate first-class organizations divide the procurement job into three phases (Fig. 2): project procurement, invitation for bids

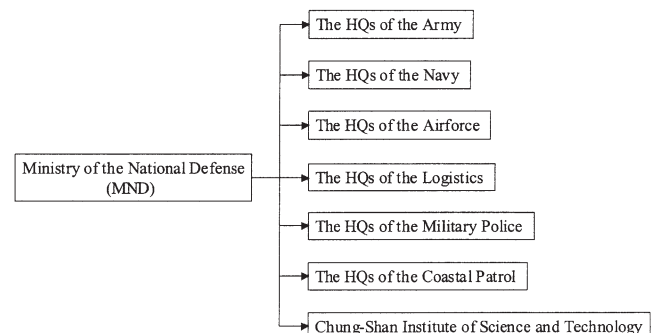


Fig. 1. Hierarchy of the military procurement organizations.

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