

Christian Epp

Internet based Technologies and Systems for the support of indirect procurement

Diploma Thesis

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Abbreviations

APS	Advanced Planning Scheduling
BOM	Bill of Materials
DPS	Desktop Purchasing Systems
EDI	Electronic Data Interchange
EFT	Electronic Funds Transfer
ERP	Enterprise Resource Planning
FTP	File Transfer Protocol
GE	General Electric
GEIS	General Electric (GE) Information Services
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
IAC	Internet Application Components
IBTS	Internet based Technologies and Systems
IP	Internet Protocol
ISP	Internet Service Provider
IT	Information Technology
JIT	Just in Time
MRO	Maintenance, Repair, and Operating
MRP	Material Requirements Planning
MRP II	Manufacturing Resource Planning
OBI	Open Buying on the Internet
ORM	Operating Resources Management
OTP	Open Trading Protocol
P-Card	Procurement Card
P.O.	Purchase Order
RAM	Random Access Memory
RFP	Request for Proposals
RFQ	Request for Quotes
ROI	Return on investment
SGML	Standard Generalized Markup Language
SLA	Software License Agreement
SOW	Statement of Work
TCP	Transport Control Protocol
TCO	Total Cost of Ownership
TPN	Trading Process Network
TQM	Total Quality Management
TVO	Total Value of Ownership
VAN	Value Added Network
WWW	World Wide Web
XML	eXtensible Markup Language

1 Introduction

1.1 Motivation

The “information technology revolution” has left virtually no area of business untouched. This revolution has seen significant advances in the procurement function of an organization in the ability to automate and systemize mundane and repetitive tasks [Bouv1995, p. 255].

Procurement is a business function that is performed in all enterprises. It is responsible for obtaining goods and services at the right price, in the right quantity, of the right quality, at the right time, from the right source with delivery at the right location [Watt 1995, p. 3, Zens1994, p. 6].

Purchases of goods and services are the largest single cost item in most companies. More dollar are spent for purchases of goods and services than for all other expense items combined, including wages, salaries, taxes, dividends, and depreciation [Kill1997, p. 5 - 17]. In addition, savings attained in purchasing translate dollar-for-dollar into profits. Because of that, reducing purchasing costs has a significant potential to improve the overall performance of an organization.

Until recently, research in procurement has mainly focused on the purchasing of direct goods, that is items that become part of the finished product. In this field, supply chain management strategies (including MRP, ERP, and EDI) aim to automate, manage and streamline the supply chain of key production materials. These systems are targeted especially to support the buying professional.

Depending on the type of industry and company, direct goods however constitute for only 40% of the total spend for goods and services. The remaining 60% are expenditures on “indirect” goods and services, which are items that do not become part of the finished product. These include items such as capital equipment, computer equipment and software, office supplies, maintenance, repair and operations (MRO) items and all types of services [Kill1997, p17]. The request of these items is usually initiated decentralized by any end-user

requisitioner within a company. This type of procurement has been neglected as a research field and has received little attention for efficiency gains even though it is characterized by being costly, time-consuming and inefficient.

Emerging technologies, especially Internet related Technologies have the potential to trigger significant changes in the field of indirect procurement.

First movers are already beginning to embrace new technologies and systems to support the procurement of indirect goods and services. Most of these systems concentrate on reducing the cost of processing a purchase order (transaction cost) by automating the procurement process. Early users hope to reduce the cost of processing a purchase order from currently estimated \$80, down to \$6 per purchase order. Therefore, they are especially suitable for the high volume, low cost items which usually account for roughly two-thirds of the purchase orders processed and only 3% of the dollars spent [Kill1997, p. 2]. However, these systems address only a subset of the entire range of indirect goods and services.

The objective in this thesis is to show how Internet based Technologies and Systems can support the procurement of the entire range of indirect goods and services.

1.2 Methodology

This thesis was written at the Fisher Center for Management & Information Technology, which is part of the Haas School of Business during a stay at the University of California at Berkeley. To develop this thesis guidance was provided by Prof. Arie Segev and Dr. Judith Gebauer of the Fisher Center.

Recent literature, trade journals, and Internet articles concerning the subject of procurement have been the main data basis for this thesis. In addition, information was captured from attending several forums on indirect procurement organized by the Fisher Center. Presentations of software vendors & integrators and first movers as well as discussions with attending procurement specialists provided further insights.

Further studies on the impact of Internet based technologies and systems on indirect procurement are being realized at the Fisher Center. This involves research on vendor systems and Internet technologies that go beyond this thesis.

1.3 Organization

The objective of this thesis is to show if and how Internet based Technologies and Systems are able to support the procurement of indirect goods and services. In order to do so, different procurement types are identified in chapter 2 and analyzed more in detail in chapter 3. Furthermore, Internet based Technologies and Systems are introduced in chapter 4.

These three chapters provide the bases for chapter 5 in which the matching between different procurement types and Internet based Technologies and Systems is realized. Figure 1 provides an overview of the organization of this thesis.

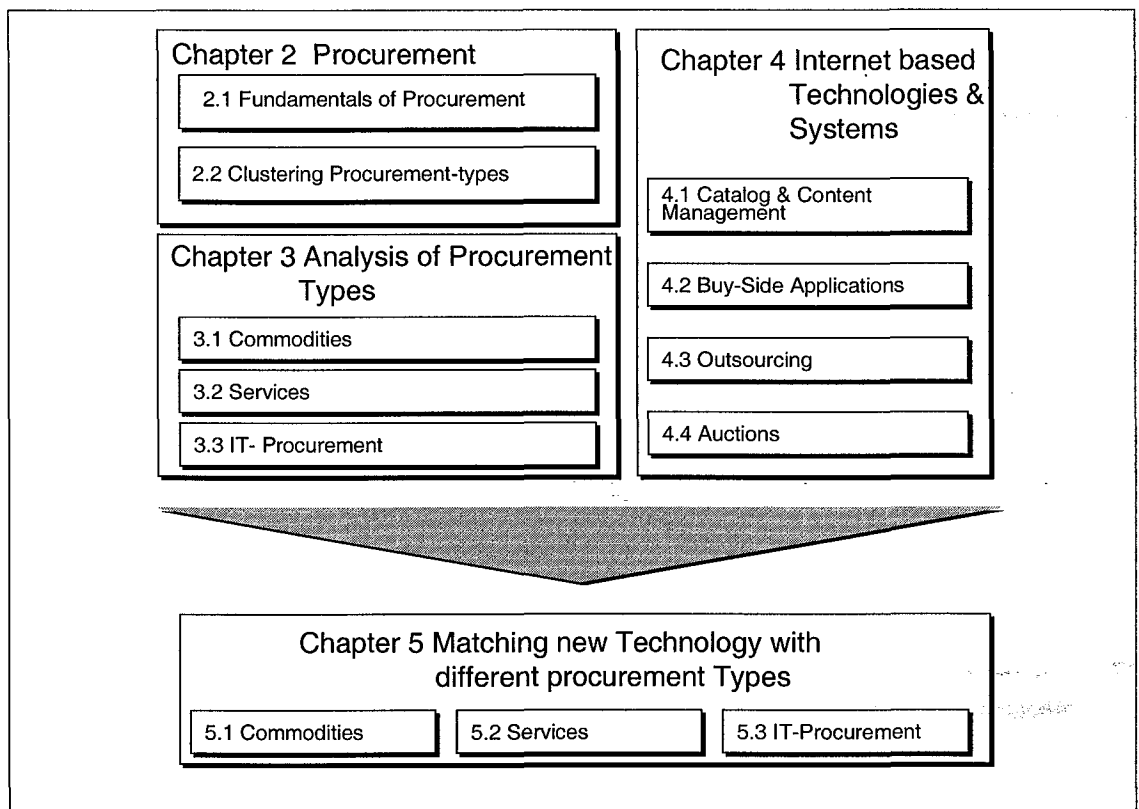


Figure 1: Roadmap

Chapter 2 introduces the fundamentals of procurement and purchasing beginning with a definition and evolution of procurement. Afterwards procurement is differentiated into direct and indirect procurement, with the focus being on the latter. This section ends with a clustering model that allows to identify different types of indirect procurement.

In chapter 3, some of these procurement types (commodities, services and IT-procurement) are addressed more in detail showing the “traditional” way of purchasing indirect goods and services. The main idea is to depict the procurement process and to identify the special user requirements of each procurement type

The objective in chapter 4 is to present the business model and main idea of the most promising and comprehensive Internet based Technologies and Systems that are able to (or have the potential to) support the procurement of indirect goods and services. Besides Catalog & Content Management, Buy-Side Applications such as Desktop Purchasing Systems (DPS) and Enterprise Resource Planning (ERP) systems, as well as Outsourcing and Auctions are going to be addressed.

In chapter 5 each of the identified procurement types is analyzed in respect of the possible support that Internet based Technologies and Systems are able to provide. In case that support is provided, the organizational implications and changes as well as some strength and weaknesses are depict.

2 Identify different types of indirect procurement

Since the focus of this thesis is to show how Internet-based technology and systems can support the procurement of indirect goods and services, special attention has to be given to the differences in the procurement process of the items purchased. These differences will determine what kind of functionality is needed from Internet-based technologies and systems in order to support that type of purchase. Therefore the objective in this chapter is to identify different procurement types which have the same requirements to the procurement processes.

This chapter begins with a brief introduction to the fundamentals of procurement and purchasing (see section 2.1). Afterwards procurement is differentiated into direct and indirect procurement, with the focus being on the latter. This section ends with a clustering model that allows identifying different types of indirect procurement which ideally have the same procurement process and the same requirements (see section 2.2).

2.1 Fundamentals of Procurement and Purchasing

The definitions of the terms purchasing and procurement vary in literature as well as throughout business organizations. Often, although somewhat imprecisely, these terms are used interchangeably [Dobl1996, p.3]. In the following, some common definitions of both purchasing and procurement will be introduced:

- **Procurement** includes all activities involved in obtaining material, transporting them and moving them towards the production process [Zenz1993, p.5]. It tends to describe a broader and more proactive function than is commonly associated with purchasing by putting a stronger emphasis on strategic matters.
- **Purchasing** on the other hand is the act of buying goods and services and therefore represents a core element of procurement [Niss1996; Geba1996]. It

is usually defined as the buying function of an organization and includes the acquisition of goods and services used in the operation of an organization. It is one of the basic functions common to all types of business enterprises [Dobl1996, 3; Fear1993, p5].

Regardless of the terminology differences depict, both terms are going to be used interchangeable throughout this thesis.

2.1.1 Purchasing Objectives and Organization

Like any other function of an organization, purchasing (procurement) is characterized by certain objectives. In general, purchasing is concerned to buy goods and services at the right price, in the right quantity, of the right quality, at the right time, from the right source with delivery at the right location [Watt1995, p.3; Chad1995, pp. 169-171; Zens1994, p. 9]

In practice the purchasing department can rarely fulfill them all equally because conflicts exist between some of the objectives. Usually some trade-offs must be made and therefore purchasing personnel seek a reasonable balance among them.

Furthermore, since purchasing is a **service organization** that exists primarily to meet the needs of other business functions, the objectives of procurement are closely related to the objectives of other departments in the enterprise, such as total quality management (TQM) and just-in-time (JIT). Therefore the procurement process not only has to meet multiple objectives simultaneously but also needs to establish, maintain, and balance a variety of external and internal relationships at the same time. [see Fear1993, p.9-12; Cart1995, pp.14-16; Perl1990, pp. 121-122].

As a service organization, purchasing is positioned between the company's "**internal customers**" in need of material to fulfill their tasks, and **external suppliers** providing goods and services [Hein1991, p. 17].