E-PROCUREMENT DIFFUSION IN THE SUPPLY CHAIN OF FOODSERVICE OPERATORS: AN EXPLORATORY STUDY IN GREECE

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Despite e-procurement’s benefits, most firms are slow in adopting it. As prior studies on e-procurement have primarily focused on investigating its benefits or adoption mainly in manufacturing, research examining the factors influencing the adoption and diffusion of e-procurement by foodservice operators is minimal. This study fills in this gap by reviewing the literature that identifies potential e-procurement adoption factors and then by testing the latter’s impact by gathering data from Greek foodservice operators. Findings showed that e-procurement is adopted by few firms, while e-procurement is diffused only in intrafirm (operational) and not interfirm (more strategic) supply chain processes. Lack of e-procurement knowledge, skills, trust, and risk perceptions were found to be the major inhibitors of e-procurement adoption. Implications for foodservice operators, Internet model developers, and e-commerce policy makers are given.

Key words: E-Procurement; Benefits; Adoption; Use; Supply chain; Foodservice operators

Introduction

Supply chain management (SCM) has exploded as a management’s major concern over the last years, because with the exploitation of new Information & Communication Technologies (ICT), and in particular of Internet, the potential to revolutionize, streamline, and enhance, supply chain operations has flourished (Caglione, Caniato, & Spina, 2003; Patterson, Grimm, & Corsi, 2003). Being a major part of SCM, e-procurement has been identified as an important element of e-business operational excellence for large firms (Barua, Konana, Whinston, & Yin, 2001). E-Procurement is defined as any ICT designed to facilitate the acquisition of goods by a commercial or a governmental organization over the Internet (Davila, Gupta, & Palmer, 2003). E-Procurement ICT include e-procurement software, B2B auctions, B2B market exchanges, and purchasing consortia that aim to automate workflows, consolidate and leverage organizational spending power, and identify new sourcing opportunities online (Davila et al., 2003). Future advances would extend these ICT to create collaborative SCM tools (Caglione et al., 2003; Folinas, Vlachopoulou, Manthou, & Sigala, 2004). E-Procurement’s benefits include: lower administration costs, inventories, and purchasing prices;
shorter order cycle time; enhanced cooperation with suppliers, performance, and multichain operations (Croom, 2000; Sigala, 2003c).

Although these advantages may suggest a rapid migration from traditional to e-based procurement models, some firms are slow in adopting e-procurement. Actually, current studies revealed that this tremendous expected growth rate has been revised downwards (Davila et al., 2003; Lancioni, Smith, & Schau, 2003; Min & Galle, 2003). However, prior studies on e-procurement have primarily focused on the evaluation of its benefits (Gupta, 1997) or its adoption in specific industries, mainly in manufacturing (Davila et al., 2003; Lancioni et al. 2003; Min & Galle, 2003). Moreover, although ICT and Internet adoption has been extensively examined in hospitality (e.g., Sigala, 2003a, 2000b; Siguaw, Enz, & Namasivayam, 2000), research investigating the level and factors impacting on the adoption and use of specific e-procurement ICT by foodservice companies has been minimal. This study aims to fill in this gap through the following process. First, as prior studies have revealed that perceived e-procurement benefits and risks can substantially impact on its adoption, the definition, use, and impact/benefits of e-procurement on Supply Chain Management (SCM) in general as well as in the foodservice supply chain are analyzed. Then, by reviewing the literature on ICT adoption as well as the few studies in e-procurement adoption, potential additional factors determining the adoption and use of e-procurement in the foodservice industry were also identified. The significance of these factors on the use and adoption of e-procurement were tested by gathering data from foodservice operators in Greece. Data provide useful information about the factors affecting e-procurement adoption by foodservice operators, while constructive implications for foodservice firms, Internet e-procurement model developers, and governmental policy makers are also analyzed.

E-Procurement: Types, Use, and Benefits

E-Procurement is an Internet technology solution facilitating corporate buying using the Internet. Four major e-procurement Internet-based ICT tools are identified (Davila et al., 2003). First, e-procurement software refers to any Internet-based software application (traditional EDI e-procurement systems have also migrated to the Internet) that enables employees to purchase goods from approved electronic catalogues in accordance with company buying rules, and captures necessary purchasing data in the process. To achieve that, the software uses protocols to automatically route and move through the necessary approval processes all employees’ purchase selections of a good found on a supplier catalogue. Internet market exchanges are called the e-procurement systems that bring together multiple buyers and sellers in one central virtual market space and enable them to buy/sell from each other at a dynamic price. Internet B2B auctions are the third type of e-procurement systems referring to events in which multiple buyers place bids to acquire goods/services at an Internet site (e.g., hospitalitysupplies.com). Last, Internet purchasing consortia gather the purchasing power of many buyers to negotiate more aggressively discounts (e.g., yassas.com aggregates demand of Greek hospitality operators, while avendra.com aggregates demand of hotel properties affiliated mainly with three major hotel chains).

Within the context of the plastics industry, Boyle and Alwitt (1999) found that the most often cited procurement use of the Internet was for consummating the transaction and the acquisition of technical advice. However, Roth (2001) recently revealed that top performers conduct more than 20% of their e-procurement transactions online, while they use the Internet for several e-procurement applications such as communicating with vendors, checking vendor price quotes, and purchasing from vendors’ catalogues. The Internet has also enabled companies to set early warning damage systems, provide information on warranty agreements, and assist in vendor negotiation. Future developments of e-procurement systems envisage the enablement of streamlined and seamless supply chains whereby networks of suppliers, manufacturers, and retailers would share information for developing collaborative competitive practices such as Collaborative Forecasting, Planning and Replenishment (CFPR) (Folinas et al., 2004). Overall, although authors do not agree on the evolution paths of e-procurement systems, all of them agree on the services extension and enhancement of their business models. So, although early e-
procurement systems focused solely on aiding procurement for both buyers and suppliers (e.g., through online catalogues), later many systems gave emphasis on online auctions for reducing the cost of goods bought. Nowadays, due to the falling price of auction software, e-procurement systems aim to survive and sustain their competitiveness by developing value-added services such as information exchange, digital catalogues, logistics services, supply chain planning and design collaboration, tax management, payment processing, inventory management, reverse logistics, CRM, and interchange connectivity (Fairchild, Ribbers, & Nootenboom, 2004).

By using an e-procurement system, a trader can participate in any stage of the SC, and is able to remove some of the inefficiency traditionally associated with supply chain. By allowing simultaneous and real-time information sharing and visibility, traders can streamline their supply chain and supplier relationships, improve their interfirm coordination, and create “real-time” demand-pulled processes that in turn eliminate unnecessary inventory costs and enhance inventory turnover rate (Folinas et al., 2004). Thus, the ultimate goal, and the main driver for integrating e-procurement systems with supply chain processes, is to reduce supply chain management costs. Overall, e-procurement can transform the whole supply chain management process, as it pervades all the major components of the purchasing process such as: definition of product design/requirements; production scheduling; suppliers’ search/selection; negotiation/contracting agreements/transactions; supplier evaluation; supply chain management and collaboration (Lancioni et al., 2003). However, Grieger (2004) argues that there has been relatively little guidance from academia on how e-procurement systems can be used to integrate business processes across the supply chain. Table 1 summarizes the major e-procurement applications across the supply chain.

E-Procurement’s benefits are widely found in the SCM and e-procurement literature and they are so great that e-procurement has turned the formerly ignored traditional procurement function into a competitive weapon. Buyers indicated that the conversion from paper-based purchasing to e-purchasing resulted in a reduction of 5–10% on purchasing price, 25–50% reduction at inventory level, a 5-day reduction in cycle time, and a US$77 saving in per requisition administrative cost (Brack, 2000). Major e-procurement benefits include (Min & Galle, 2003; Roth, 2001):

- cost savings and subsequent increase in return on investment (ROI), resulting from reduced paper transactions, shorter order cycle time, and the subsequent inventory reduction due to the speedy transmission of order-related information;
- Just-in-Time inventory and procurement practices;
- enhancement of supply chain efficiency by providing real-time data regarding product availability, inventory level, shipment status, production requirements;
- facilitation of collaborative planning among supply chain partners by sharing data on demand forecasts and production schedules that dictate supply chain activities;
- effective linkage of customer demand information to upstream SCM functions, while also facilitating “pull” (demand-driven) SCM operations.

Specifically within the foodservice supply chain, the capability and value of e-procurement systems to integrate and increase the effectiveness of the whole supply chain becomes critically important. This is because of the short-life nature of the products traded in foodservice supply chains, which presents some of the biggest challenges for supply chain management (Shulman, 2001). With the substantial increase of cooked-chill foodservice operations, food SCM is challenging and important in the field of short-life goods owing to a high number of product variants, strict traceability requirements, short life of the products, and the need for temperature control in the supply chain (Bubny, 2000). Furthermore, the large volume of goods moved in the supply chains makes efficient practices a necessity, as small percentage changes in operational cost add up to significant amounts, thereby impacting on profit margins. Moreover, the number of product variants in the short-life category has increased over a relatively short period of time, mainly due to the increased and sophisticated demand requirements and preferences (e.g., increased variety and numbers of organic, vegetarian, low fat, and other special dietary offer-
ings and meals). The high number of product variants greatly increases the complexity of the supply chain control, and thus often degrades supply chain performance by causing scheduling, capacity planning, and inventory management to be more complex. It is, for example, difficult and time consuming to forecast the consumption of all variants. Moreover, as only a limited amount of safety stock can be held due to the limited life of products, the availability of the products cannot always be ensured. Spoilage is an additional problem in short-life goods, and the minimization of inventories is a key for reducing spoilage. It thus becomes evident that e-procurement systems can lead to substantial business benefits by integrating and creating seamless food supply chains.

Factors Influencing E-Procurement Adoption and Use

Despite the great benefits of e-procurement technologies, their adoption is still at their early stages (Davila et al., 2003). A variety of factors may affect a firm’s decision to adopt and implement a particular ICT. In consolidating prior studies examining innovation, Kwon and Zmud (1987) classified variables that potentially influence ICT adoption into five broad categories: individual, task and innovation related, organizational and environmental characteristics. Patterson et al. (2003) also showed that the following organizational and environmental factors positively affected the adoption of ICT in SCM: organizational size; decentralized organizational structure; supply chain strategy integration; transactional climate and supply chain member pressure; and environmental uncertainty. Kwon and Zmud (1987) and Christou and Kassianidis (2003) also suggested that these factors may be important to differing degrees depending on the context or technology. For example, individual factors such as age or education are often more relevant with individual adoption of technology than with organizational innovation whereby decisions are made by committees. Additionally, task characteristics may be isolated and examined when individual technologies are being studied. As this study examines the organizational adoption of e-procurement systems, the focus is limited on the following key organizational, innovation-related, and environmental factors.

Organizational Factors

The ICT literature in general (e.g., Dewar & Dutton, 1986; Galbraith, 1977; Min & Galle, 1999) and in the hospitality industry (e.g., Sigala, 2003a; Siguaw et al., 2000) has demonstrated that larger organizations are more likely to facilitate ICT innovation and adoption due to their financial capacity, infrastructure, and organizational power. By analogy, it can be claimed that e-purchasing adoption can be influenced by a large firm size and purchasing workforce. The rationale is that a buying firm with a larger purchasing unit is more likely to adopt e-purchasing, as it has greater information processing capacity, needs, and organizational power than smaller firms. Moreover, a buying firm with a large purchasing unit is also more likely to possess the financial and skill resources and bargaining power to achieve the economies of scale required.

Within hospitality, affiliation with a hotel chain/alliance or consortia was found to positively affect ICT adoption and use (Sigala, 2003b; Siguaw et al., 2000). Small firms also lack ICT knowledge and technical skills. The Organisation for Economic Cooperation and Development (OECD) (1998) and Walczuch, Van Braben, and Lundgren (2000) attributed the failure of European small and medium enterprises (SMEs) to utilize e-commerce to their lack of e-commerce and Internet knowledge. A study of international technology adoption conducted by Phillips, Calantone, and Lee (1984) found that attitude and behavioral intention to adopt new technologies depended on the perceived benefits of the technology and the perceived ease of use/adoptions. In other words, managers that do not realize the benefits of technology use and how they can easily integrate it to their business processes are very unlikely to adopt the new technology. Similarly, a study analyzing technology adoption (Wozniak, 1987) illustrated that education and information enhanced the ability to overcome resistance to technology change, thereby raising the probability of adoption. This is important because ICT adoption can also be affected by
the organizational readiness as well as willingness to change and integrate processes to new management practices. Because of the obstacles in developing the necessary skills and technical knowledge, many firms postpone ICT adoption until they gain sufficient internal expertise. Moreover, as ICT knowledge of hospitality staff also positively affects ICT adoption and use (Sigala, 2003a), it is overall claimed that e-procurement adoption and use by foodservice firms can also be influenced by staff’s knowledge on e-procurement use and benefits.

Innovation-Related Factors

Research on innovation revealed that the characteristics of innovation, as perceived by the adopting firm, can crucially impact on its adoption (Rogers, 1983). Based on a meta-analysis of the technological innovation literature concerning the characteristics of innovations, Tornatzky and Klein (1982) identified relative advantage, compatibility, and complexity as innovation characteristics salient to the formation of the adoption attitude. Relative advantage is the degree to which an innovation is perceived as better and more beneficial than its precursor; compatibility is the degree to which an innovation is perceived as consistent with existing values, needs, and past experiences of the adopter; and complexity refers to the degree to which an innovation is perceived as difficult to use and implement (Rogers, 1983).

Thong (1999) proved that positive perceptions regarding the ICT benefits provided an incentive to adopt ICT. Drew (2003) also concluded that many managers rejected the notion that e-commerce could be useful to their businesses as they had no idea of the potential e-commerce benefits, while Walczuch et al. (2000) revealed that the main barriers to Internet adoption and use are simply managers’ concern and perceptions that the Internet would not lead to more efficiency or lower costs. Preliminary research on e-procurement (Min & Galle, 2003) also revealed that perceptions regarding the benefits, costs, and risks of e-procurement systems significantly affect the latter’s adoption. Each system of e-procurement involves different risks, costs, and investments. Although implementation of B2B auctions, market exchanges, and purchasing consortia via existing networks require limited costs, e-procurement software involves larger investments. The business and ICT risks and complexities of e-procurement that can affect its adoption are analyzed below (Davila et al, 2003):

- **Internal business risks:** Firms’ uncertainty on the availability of appropriate resources to successfully implement e-procurement, such as well-performing and effective systems, that can also be integrated with existing ICT (e.g., accounting, human resources, asset, cash, inventory management, and production planning) (Subramanian & Shaw, 2004).

- **External business risks:** E-Procurement tools need to integrate with external systems and cooperate with external constituencies (customers, suppliers), who also need to develop internal systems for facilitating electronic communication. However, suppliers may be hesitant or even unable to meet such demands without guarantees of future revenue streams. Daniel, Hoxmaier, White, and Smart (2004) clearly illustrated that when in a given industry a significant number of firms do not have the appropriate systems to integrate with e-procurement systems, or those systems are not integrated with the e-procurement, than firms are less willing to participate in such platforms. In turn, due to network externalities, this lack of participation also dissuades other traders in this industry from participating in these platforms. Moreover, price reductions due to auctions and enhanced global online competition may force suppliers to reduce their quality and services (Verhagen & Tan, 2004).

- **Technology risks:** Companies also fear the lack of a widely accepted standard and a clear understanding of which e-procurement technologies best suit the needs of each company. The lack of a widely accepted solution blocks the integration of different e-procurement software across the supply chain. For example, Fairchild et al. (2004) proved that the industry dominance of an e-procurement system and/or system leader can strongly influence the whole industry adoption level of that system. However, this also implies
the need of open standards for facilitating interorganizational e-procurement systems.

- **E-procurement process risks:** This refers to the security and control of the e-procurement process itself, as security breaches endanger the function of operating systems as well as the information access, exchange, and disclosure. In general, e-procurement systems create two types of uncertainty and risks that can inhibit e-procurement adoption. Uncertainty not only relates to risks related to online transactions’ security but also to the ongoing distrust of e-procurement users in the transfer of crucial organizational data through the Internet and in data sharing with a third party. The difficulty in estimating the behavior of the exchange partner is defined as relational uncertainty (or opportunism in the transaction cost theory) and highlights the need of e-procurement systems to develop and foster strong relational bonds (such as trust, satisfaction, commitment, and good communication tools) in order to develop, maintain, and foster long-term collaborative relationships with their clients. In reviewing the literature in e-market places’ trust and risk/uncertainty, Verhagen and Tan (2004) distinguished between institutional and party trust/risk. Institutional risk refers to the potential failure of the institutional mechanism employed by the intermediary to reduce opportunistic behavior between trading partners, while party risk reflects the uncertainties and relations risks that arise because one is unsure about the offers of the counterpart of the transaction and its ability and willingness to perform. On the other hand, institutional trust refers to the trustworthiness of the e-procurement operating system (e.g., perceptions of security due to the presence of guarantees, regulations, and security introduced by the intermediaries), while party trust concerns perceptions of trust in the counterpart of a transaction.

### Environmental Factors

Regarding the environmental factors, empirical studies have shown that competition increases the likelihood of innovation adoption (Abell & Lim, 1996; Patterson et al., 2003). It is tough rivalry that pushes businesses to be innovative. Competition leads to environmental uncertainty and increases both the need for and the rate of innovation adoption. Thus, managers perceiving a greater level of competition would feel a greater need to turn to e-procurement to gain a competitive advantage, while managers perceiving a lower perceived level of competition would not be faced with a push to be innovative. However, organizations do not act solely in response to economic factors. Rather, they often follow “collective norms,” leading to “homogeneity in structure, culture and output” (DiMaggio & Powell, 1983, p. 147). DiMaggio and Powell attributed these tendencies to three institutional influences. The first unfolds as a firm reacts to environmental uncertainty by imitating others’ actions. Typically, a company models itself after firms it perceives as successful or trend setting. This process is especially relevant to Internet use and adoption (Min & Galle, 2003). The second mechanism is related to norms and is “coercive,” while it describes cases whereby firms upon which a company depends demand that it acts in certain ways. In e-procurement, distributors and suppliers typically wield influence. The third factor arises because firms need legitimacy and professionalism in their markets. The concept of legitimacy is crucial in e-procurement as its systems are both new and sophisticated. Could a foodservice operator that lacks an e-procurement system, for example, be considered a legitimate player in the minds of potential suppliers/distributors? So, it is expected that greater pressures from institutional actors would relate to greater e-procurement exploitation.

### Research Aims and Methodology

This study aimed to investigate the use of e-procurement technologies and their diffusion within the supply chain processes as well as to identify the factors influencing e-procurement adoption in the Greek foodservice sector. After reviewing the literature, several factors, clustering into three general types, were identified as potential influencers of e-procurement adoption, and their significance was tested by collecting data from foodservice operators in Greece. To achieve that, two constructs were developed and operationalized as follows: e-procurement use was mea-
E-PROCUREMENT IN FOODSERVICE SUPPLY CHAIN

According to Lancioni et al.’s (2003) classification of e-procurement applications (a yes or no answer indicated whether respondents have been using an e-procurement system for implementing each application) (Table 1). Lancioni’s scale was adopted as it clearly identified e-procurement uses across the supply chain processes; respondents’ perceptions regarding e-procurement were measured by several statements covering the previously identified organizational, innovation-related, and environmental factors that may affect their e-procurement adoption and use (a 5-point Likert scale was used) (Table 2). For gathering primary data, a questionnaire comprised of three sections was developed. The first section collected data regarding firms’ use of e-procurement systems, the second collected data regarding firms’ perceptions regarding e-procurement, while the last gathered data about the firms’ size, type and management arrangement (i.e., independent, franchisee, or chain).

Although it is difficult to measure the precise size of the Greek foodservice sector due to its high seasonality (several operators close during the winter months) and black economy (Athanasiou, 2004), there are about 67,000 foodservice operators in Greece (Greek National Statistical Service [GNSS], 2002). The high seasonality of the sector is clearly reflected in the statistics referring to the number of employees working within this sector; the average number of employees is 259,200 employees, while during the low season the level of employment reduces to approximately 198,000 and during the high season employment rises to approximately 304,200 employees (GNSS, 2002). Due to time and costs implications, only a small and convenience sample was possible to target.

The questionnaire with a prepaid self-addressed return envelop and a covering letter explaining the purpose and confidentiality of the research was posted or personally given to the manager of a convenience sample of 765 foodservice firms operating in Greece. Professional contacts of the researcher and the geographical proximity to numerous foodservice operators were exploited for distributing the questionnaire. After a follow-up, 134 usable questionnaires were returned giving a respectable—relative to other studies in Greece—response rate of 17.5% (Sigala, 2003a). Despite the small sample, results provide good preliminary findings regarding the context of e-procurement in the Greek foodservice sector.

Data Analysis and Discussion

The respondents’ profile reflected the structure of the Greek foodservice sector (i.e., highly fragmented with many small and few franchisee or chain operators) (GNSS, 2002). Thirty-eight percent of respondents employed between 1 and 20 employees, 33% between 21 and 50, and the remaining (29%) more than 51; 28% represented fast food operators, 43% full-service restaurant operators, 17% contract catering operators, 12% precooked food and beverage retailers, and 14% were franchisee or members of a chain.

Table 1 provides data regarding respondents’ adoption and use of e-procurement systems. E-procurement adoption is very limited (60.4% of respondents do not use any type of e-procurement). This is not surprising when considering the small size of respondents’ businesses and their perceived low ICT skills (Table 2). From those using at least one e-procurement system, data revealed that e-procurement software is the most popular e-procurement system, followed by Internet market exchanges, then B2B auctions, and finally by purchasing consortia. It should be highlighted that all adopters of e-procurement software (33 respondents) were franchisee or chain operators, indicating that the use of the former may have been imposed and/or provided by the franchisor/chain operator. The popularity of the market exchanges can also be attributed to the numerous relevant websites, the simplicity of their business model, and their user-friendly interface/systems (Davila et al., 2003). In Greece, several e-procurement marketplaces have become dominant lately: yassas.com has more than 600 hospitality firms registered in its demand member database (including major firms such as Grecotel, Famous Gastronomy, Holiday Inn, Mamidakis Hotel Chain, Amalia Hotels, Louis Hotels, G-Hotels, Robinson Club Hotels) and the public funded e-commerce centers such as the e-cyclades.gr. Finally, findings confirmed the impact of institutional factor (coercive), characteristics of the ICT adaptor (size, affiliation, resources) and innovation (complexity, cost, risks) on the adoption decision and type of e-procurement.
Table 1
Respondents’ Adoption and Use of E-Procurement ICT (% of Respondents)

<table>
<thead>
<tr>
<th>Adoption of e-procurement types/systems</th>
<th>(% of Respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least one e-purchasing ICT</td>
<td>39.6%</td>
</tr>
<tr>
<td>None e-purchasing ICT</td>
<td>60.4%</td>
</tr>
<tr>
<td>E-Procurement software</td>
<td>24.6%</td>
</tr>
<tr>
<td>Internet B2B auctions</td>
<td>5.2%</td>
</tr>
<tr>
<td>Internet market exchanges</td>
<td>8.2%</td>
</tr>
<tr>
<td>Internet purchasing consortia</td>
<td>1.5%</td>
</tr>
</tbody>
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E-Procurement use

- Purchasing operations: 28.3%
- Inventory management applications: 23.1%
- Purchase from catalogs: 17.1%
- JIT delivery programs: 9.4%
- Communicate with vendors: 15.3%
- Communicate out of stock: 13.9%
- Negotiate with vendors: 2.1%
- Track order and ship date delays: 4.2%
- Check vendor price quotes: 18.6%
- Manage supplies’ inventory levels: 6.3%
- Warning damage/expiration notification: 0.7%
- Field warehouse/depots inventory levels: 0.0%
- Transportation applications: 2.9%
- Emergencies affecting inventory: 4.7%
- Pickups, regional distribution centers: 1.4%
- Field depots on out of stock: 1.4%
- Drop-offs, regional distribution centers: 0.7%
- Ordering processing applications: 1.4%
- Monitor on-time arrivals of carriers: 1.4%
- Monitoring vendors’ order efforts: 0.0%
- Managing claims and overall performance: 0.7%
- Check vendor credit: 0.0%
- Vendors’ deliveries to depots: 0.7%
- Obtain price quotes/bids from vendors: 1.4%
- Vendors’ raw material stock levels: 0.0%
- Production scheduling applications: 1.4%
- Provide vendor information from queries: 0.7%
- Coordinate schedules with vendors/field depots: 0.7%
- Vendor ratings on overall performance: 1.4%
- Exchange data with vendors/field depots: 0.0%
- Process returns/damaged products: 1.4%
- Coordinate with JIT of vendors: 0.7%
- Ratings of on-time carriers’ performance: 1.4%
- Coordinate schedules with affiliated units: 1.4%

Data also revealed that e-procurement adopters mainly use the systems for purchasing operations and inventory management applications (28.3% and 23.1% respondents, respectively, reported to use Internet-based systems). Fewer adopters used the systems for searching for supplies and prices and for communicating with vendors (purchase from catalogues, 17.1% of respondents; communicate with vendors, 15.3%; check vendor price quotes 18.6%; communicate stock-out, 13.9%), while the remaining applications of e-procurement were less popular and diffused very limitedly within the respondents’ supply chain operations. Overall, consistent with previous findings (Lancioni et al., 2003), data revealed that the use of e-procurement systems is mainly confined to internal supply chain processing such as sourcing, ordering, and supplies tracking. On the contrary, e-procurement has not affected interfirm collaboration in the supply chain that is characterized by longer term orientation, strategic practices, and exchange of strategic information among supply chain members (e.g., interfirm collaboration on demand and inventory management to achieve efficient customer response). Hence, adopters are still in their first stages of e-procurement use as they focus on transaction-based services (e.g., automation of processes) and benefits rather than strategic supply chain management services. Indeed, based on the internal and external integration of e-procurement systems with other SCM systems/operations, Folanas et al. (2004) identified three stages of e-procurement exploitation ranging from the simple automation and reengineering of functional processes to the interferm coordination of activities in a supply chain network.

Table 2 lists respondents’ perceptions regarding e-procurement. *-Tests revealed significant differences between adopters’ and nonadopters’ perceptions, providing support of the adoption influence of most of the previously identified factors. Overall, nonadopters had significantly stronger negative perceptions regarding e-procurement ICT and business risks, less knowledge and skills of e-procurement benefits and applications than e-procurement adopters. Thus, the data revealed that limited knowledge on e-procurement may have adverse effects on e-procurement adoption as well as it may have created misconceptions about its benefits and risks, which in turn may have inhibited its adoption. On the contrary, adopters and nonadopters did not report significantly different perceptions regarding: the professionalism status of e-procurement; the importance of an e-procurement industry standard; and the importance of the integration with legacy systems. Although these findings may not support the latter’s factors’ impact on e-procurement adoption, the data are not surprising when considering that ICT adoption within the Greek economy and foodservice sector...
Table 2
Factors Influencing E-Procurement Adoption

| Supply chain constituencies relations (external business risks and institutional influences) | Adopters | Nonadopters | t | Sig. |
| E-Procurement involves dealing with anonymous vendors that our company has not “vetted” against quality, service, and delivery standards | 2.01 | 3.29 | 2.01 | 0.001 |
| E-Procurement may lead to downward price pressure on vendors that may in turn create quality issues | 2.31 | 2.78 | 0.003 |
| Risk of downward price pressing vendors to diminish customer service | 2.51 | 2.65 | 0.054 |
| Failure to adopt an ICT may lead to inability to trade with a major supplier | 2.45 | 2.01 | 0.042 |
| All foodservice operators and particularly the best use e-procurement | 2.54 | 2.51 | 0.473 |

| ICT, internal business, and procurement process risks | Adopters | Nonadopters | t | Sig. |
| Reluctance with our firm to allow intermediaries (e.g., yassas.com) to become part of existing purchasing processes | 3.46 | 3.04 | 0.048 |
| Lack of an industry e-procurement standard | 2.35 | 2.46 | 0.301 |
| E-Procurement provides opportunities for hackers to paralyze firm operations | 2.01 | 2.42 | 0.023 |
| Potential loss of proprietary and confidential information | 1.97 | 2.34 | 0.037 |
| Proprietary/confidential purchasing data may end up in competitors hands | 1.96 | 2.23 | 0.029 |
| Lack of faith in transaction and data integrity | 2.01 | 2.28 | 0.128 |
| Lack of faith in transaction and data security | 1.96 | 2.36 | 0.049 |
| Potential loss of control and segregation of duties | 1.81 | 2.24 | 0.003 |
| Difficulty integrating e-procurement solutions with legacy systems | 3.66 | 3.95 | 0.146 |

| Cost/benefit concern—perceived relative operational and competitive advantages | Adopters | Nonadopters | t | Sig. |
| It would be too expensive to move procurement to the Internet | 2.69 | 3.36 | 0.045 |
| Expenses far exceed benefits of moving to e-procurement | 2.63 | 3.01 | 0.026 |
| E-Procurement is a vital application for addressing competitive forces | 2.84 | 2.37 | 0.002 |

| Organizational skill set and resources | Adopters | Nonadopters | t | Sig. |
| General lack of awareness as to which solutions best meet my firm’s needs | 3.06 | 3.99 | 0.032 |
| A lack of firm readiness (supporting processes, ICT capabilities, skills gaps) | 2.97 | 3.56 | 0.025 |
| E-Procurement systems are too complex for our staff to use | 3.07 | 3.73 | 0.042 |

Likert scale: 1 = totally disagree, 5 = totally agree. Adopters versus nonadopters: p < 0.001.

is very limited and of low sophistication (Sigala, 2003a), meaning that the importance of an industry standard and technology integration is not critical at this adoption stage.

Conclusions and Practical and Research Implications

The findings provide preliminary and exploratory evidence of the e-procurement adoption and diffusion level as well as the factors influencing adoption rates within the context of Greek foodservice operators. Firms are currently at their early stages of e-procurement use, while several organizational and environmental factors as well as e-procurement systems-related characteristics can play a crucial role in e-procurement adoption. So firms that perceive e-procurement as beneficial, noncomplex, compatible, and of low risk to use are more likely to adopt e-procurement. This is compatible with previous studies illustrating that the main barriers to technology adoption are simply the concern that technology would not lead to more efficiency, lower costs, or more revenues.

Consistent with previous research, this study has also revealed that Internet and ICT skills as well as awareness of technology benefits and use can crucially influence ICT adoption. In raising the demand side of e-procurement knowledge and skills, Deeter-Schmelz, Bizzari, Graham, and Howdysheil’s (2001) study advocated the critical role that the supply side can show. Indeed, although previous studies have ignored the supportive role that the supply side can play in boosting e-procurement adoption, few studies have shown that supply-related factors and supportive activities (e.g., provision of educational seminars, suppliers’ discounts and price incentives) are more likely to accelerate the acceptance of an innovation than demand-related factors (Cool, Dierickx, & Szulanski, 1997; Gatignon & Robertson, 1989). Based on this study’s findings, the role of supply-
side operators raising demand side awareness on
e-procurement use and benefits seems to be quite
critical, because the technology use and benefits
myopia from which foodservice operator suffer
can inhibit them to further understand how to
adopt and beneficially use e-procurement.

Specifically, recommended supply-side sup-
portive actions either provided by the public and/
or the private sector are analyzed as follows. For
policy makers wanting to increase e-procurement
use and its strategic impact on SCM, the best strat-
ey of convincing foodservice operators of the
benefits of e-procurement is by skills development,
training provision, and showing concrete ex-
amples. Policy support (at both national and Euro-
pean level) has been great for fostering ICT
adoption, particularly in SMEs (such as the major-
ity of foodservice operators), e-business forum.
Thus, it is proposed that policy making can also
be used for fostering e-procurement use as it has
been done, for example, in many other cases (e.g.,
for e-marketing adoption). One can think of show-
cases of similar firms that have achieved higher
efficiencies and/or cost reductions through e-
procurement solutions and then leave it to the imi-
tation, bandwagon, and professionalism effects to
boost ICT take-up rates. The challenge for e-
procurement system developers is to give evidence
to nonusers as well as skeptical current users that
their technologies: do not undermine control, secu-
ritY, or privacy requirements; are not so techni-
cally complex that firms without sufficient ICT
skills cannot use them; and new models give the
right incentives to supply chain constituencies to
effectively use them. Specifically, the develop-
ment and showcase of e-procurement systems as
“care-taking institutions and platforms” is criti-
cally important, because previous studies (Verha-
gen & Tan, 2004) have proven that organiza-
tional buyers’ perceptions of trust and risk regarding
the suppliers trading on the e-procurement platform
substantially depend on buyers’ perceptions about
the risk and security of the e-procurement plat-
form. This is because it was found that e-procure-
ment systems that build and invest on systems/
tools ensuring security of transactions and inform-
ation dissemination/storage also indirectly en-
hance organizational buyers’ trust on the reliabil-
ity and trustworthiness of the traders/suppliers
found on the e-procurement platform (Verhagen &
Tan, 2004).

Findings also revealed that firms with knowl-
edge and skills on e-procurement are more likely
to adopt it and thus confirmed the idea of lowering
knowledge barriers. To the extent that firms can
lower their knowledge inadequacies, they can fa-
cilitate their e-procurement adoption and strategic
use. To address this, foodservice operators may
supplement their inadequate e-procurement knowl-
edge by engaging external experts such as consult-
ing firms and ICT vendors. In the same vein, in
order to overcome knowledge barriers, the promo-
tion of e-procurement has been accompanied in
several countries by significant changes in the in-
stitutional structure of governmental agencies
involved in the regulation, development, and pro-
motion of the ICT industry and diffusion. In
Greece, several policy developments are initiated
through the e-business forum but wider diffusion
of its practices outside of major cities is required.
Finally, findings revealed that the environmental
characteristic of competition does not really pro-
vide any direct “push” for e-procurement adop-
tion, as e-procurement adopters have not done so
because of their competitors. However, data showed
that vendors and affiliates may “push” foodservice
operators to adopt certain e-procurement systems.
In this vein, policy makers may use this factor for
boosting the adoption of e-procurement systems in
supply chains.

However, the findings refer only to a specific
context (i.e., the Greek foodservice industry). Coupled also with the small and convenience sam-
ple of the study as well as the fact that the foodser-
vice sector is also highly fragmented, future re-
search should extend and further refine this study
by investigating the following issues: the addi-
tional factors (e.g., cultural, political, business sea-
onality, existing relations with suppliers) that
may affect e-procurement adoption in Greece and
in other countries/sectors; the specific factors af-
fected e-procurement adoption within small and
medium firms; the factors affecting the implemen-
tation and the strategic exploitation of e-procure-
ment’s potential to transform supply chains; the
appropriateness of different e-procurement models
and systems for different firms, contexts, and sup-
ply chain applications. Moreover, future studies
could also extend the purpose and aim of this study from the sole focus on the adoption of e-procurement systems to the in-depth investigation of particular factors that can affect the most effective diffusion of e-procurement systems within firms. In further examining e-procurement diffusion, it is evident that organizational factors, such as readiness and willingness to adapt the whole aspect of an organization to new management practices, become critically important and warrant more thorough discussion and exploration.

Biographical Note
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