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Electronic Procurement: Dealing With Supplier Adoption

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Abstract: E-procurement systems make purchasing activities more effective in terms of both time and cost. However, over the past years there is evidence that some of the expected benefits have not been achieved. Among several causes, supplier's low adherence to such platforms has been regarded as one. The focus of this research is in supplier adoption of e-Procurement. It will help to better address the issues actually faced by suppliers within e-Procurement. We have conducted a questionnaire-based survey to 721 Portuguese companies and performed an empirical analysis of the data. The findings from this work provide evidence that the supplier perceived indirect benefits and business partner pressures are most important to e-Procurement adoption while barriers have a negative impact on their adoption. The main critical success factors on e-Procurement adoption are also presented.

Keywords: e-Procurement, Collaboration, e-Commerce, B2B, IT Adoption.

1 Introduction

Procurement is a common business activity since companies depend on goods and services provided by other companies. It is estimated that about 75% of sales revenue will be applied to the purchase of goods or services [1]. Suggested by its name, e-Procurement is the application of information technologies in the procurement process. Gershon [2] considers e-Procurement as the whole process of acquisition from third parties over the internet; this process spans the whole life cycle from the initial concept and definition of business needs to the end of the useful life of an asset or end of a services contract. E-Procurement allows part or all of purchase activities to be conducted electronically, leading to cost reduction in goods, improved order processing times and gains in transparency [3].

An e-Procurement system depends on several critical success factors (CSF). Among the different CSF identified in the literature, supplier adoption is one of the most important [4]. A successful e-Procurement system is required to have suppliers willing and able to trade electronically [5]. However users of e-Procurement reported that they can acquire goods over the Internet from only 15 % of their supply base [6]. A report from the European Union (EU) also confirms that only 13% of EU companies are receiving orders online and 27% placing orders online with suppliers

[7]. Engaging suppliers in the process (especially smaller companies) has proven to be difficult given the level of investment required and the different needs of their customer base in terms of technologies and internal procedures. Although suppliers play an important role in the global success of e-Procurement implementations, their adoption factors have been studied very little [8].

In this study, we will examine the main factors affecting supplier adoption of e-Procurement. While the majority of the actual literature focuses only on the buyer side of e-Procurement [9-10], this research will focus on the seller side. Moreover, the identification of the perceived benefits, perceived barriers, CSF and business partner influence will help the research community and the business community to produce a deeper understanding about e-Procurement adoption by suppliers.

2 Literature Review for the Adoption of e-Procurement

Through an extensive literature review some variables were identified as contributing positively or negatively to supplier's adoption. A framework was developed to structure these variables. Those were divided into perceived benefits, perceived barriers, CSF and business partner influence (Figure 1). This was adapted from the framework developed by Gunasekaran and Ngai [9] to study e-Procurement adoption.

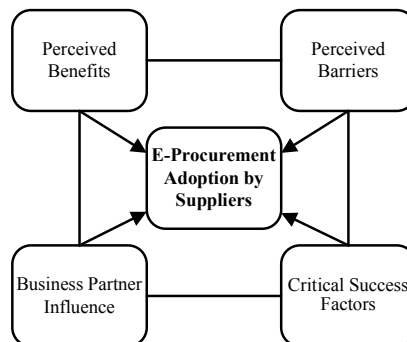


Figure 1. Framework for e-Procurement adoption.

2.1 Perceived Benefits

The perceived benefits of e-procurement as seen by suppliers have tremendous implications whether they go for the technology or not. For suppliers, the adoption of e-Procurement may be an opportunity to expand sales [11]. E-Procurement tools have also been seen as able to improve transparency compared to traditional means [12]. Closer buyer-supplier relationships [13] and the generation of competitive advantages [14] are some of the other benefits expected (Table 1).

Table 1. Perceived benefits (items) and literature support.

Perceived benefits (items)	Authors
Sales Growth	[11-12, 15-16]
Reach New Markets	[11-12]
Reductions in order processing costs	[15]
Better operational efficiency	[12, 15-17]
Better negotiable transparency	[12, 18-19]
Improved relationship with clients	[12-13, 20-23]
Gain of competitive advantage	[14]

2.2 Perceived Barriers

Perceived barriers (Table 2) contribute negatively to the intention of adopting e-Procurement. Suppliers are concerned that e-Procurement technologies will push prices down [6] and will result in high implementation and maintenance costs. Lack of interoperability and standards with traditional communication systems may difficult the integration with suppliers systems [24]. Further lack of knowledge about legal aspects and security concerns may also avoid e-Procurement adoption.

Table 2: Perceived barriers (items) and literature support.

Perceived barriers (items)	Authors
Price reduction pressures	[6, 16]
Implementation costs	[24-26]
Integration costs and maintenance	[27]
Lack of interoperability between systems	[6, 20, 24, 28]
Lack of legal support	[14, 29-30]
Lack of information security	[6, 29]
Lack of skill and knowledge	[31]

2.3 Critical Success Factors

The CSF (Table 3) could be defined as the best practices for the successful use of the e-Procurement system. The adequate training of the employees will enable them to take advantage of the new system [32]. Integration solutions should be offered properly to suppliers [26]. Top management has to support the e-Procurement implementation into their business [9]. An implementation of an e-Procurement platform may also represent an opportunity to reengineer business processes [33]. Neef [17] recommends that key suppliers should be seen as an integral part of the e-Procurement project, provided with clear and attainable milestones and directly included in the change management plan.

Table 3. Critical success factors and literature support.

Critical success factors	Authors
Initial training	[29, 32, 34-35]
Integration with current systems	[22, 26]
Top management support	[9, 27, 36]
Business process reengineering	[33, 37]
Adoption process support	[17, 20, 38]

2.4 Business Partner Influence

Previous research has found that business partner influence plays an important role in technological adoption [39] (Table4). For example, Chwelos et al. [40] concluded that external pressure and readiness is considerably more important than perceived benefits. Grandon and Pearson [41] identified external pressure as influencing electronic commerce adoption. Further Teo et al. [42] examined various factors associated with the adoption of e-Procurement. They found that business partner influence was positively associated with the adoption of e-Procurement.

Table 4. Critical success factors and literature support.

Business partner influence	Authors
Business partner influence	[39, 40, 41, 42]

3 Research Questions and Methodology

E-procurement systems can be classified in a number of ways. Kim and Shunky [28] classify them according to their location. They may be located at the supplier, the buyer or a third party provider. For the buyer side, systems typically owned by large companies, it is their responsibility to ensure that enough suppliers are adopting the system.

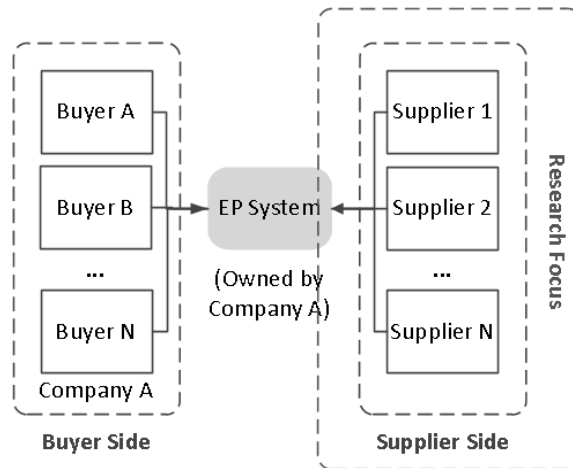


Figure 2. Research Focus

The aim of this paper is to gain an understanding of the factors affecting e-Procurement adoption by suppliers, with a focus on buyer centric e-Procurement systems, in which typically suppliers have less bargain power (Figure2). In this context, the buyer plays the role of an initiator, while suppliers act as followers. Consequently, it is fundamental to answer the following research question:

- What are the major factors for the adoption of e-Procurement by suppliers?

To answer this question, we made a questionnaire to collect quantitative data relevant to the objectives of the study, as well as descriptive information. During the month of May 2009 the questionnaire went through a pretesting process before being submitted. Then an invitation by email was sent to suppliers in order to conduct the survey online. This allowed the direct entry of data by the respondents, reducing common errors in data entry through the use of standard inputs. A number of 2,287 Portuguese companies visited the survey page. A number of 735 companies completed the survey but 14 responses were rejected due to errors or invalid data, resulting in 721 valid answers and a response rate of 31.5%. In the next section we will use descriptive statistics, factorial analysis and tests of correlation to analyze the results.

4 Empirical Results and Analysis

4.1 Characteristics of Data

The industry classification from the 721 participating companies is shown in Table 5. The responses include a broad range of companies based on different types of markets served and products sold. As such, the sample appears to be representing of a wide range of different companies. About 93% of the companies of this sample can be

classified as small or medium companies while 7% are considered large companies. About 87 % of the respondents were people in relatively high positions at their companies. The high hierarchical levels of respondents provides some assurance on the validity of responses, since the respondents in higher management levels could generally be expected to be more familiar about their companies' e-Procurement activities than those from lower levels.

Table 5. Industry type, firm size classification and job position.

Industry type	Freq.	%
Financial Services	10	1.4
Retail	188	26.1
Marketing & Advert.	27	3.7
Eng. & Construction	71	9.8
Logistics	13	1.8
Services	247	34.3
Manufacturing	134	18.6
Tourism	31	4.3
Total	721	100.0

Classification	Freq.	%
Small	566	78.5
Medium	101	14.0
Large	54	7.5
Total	721	100.0

Job position	Freq.	%
President/Director	396	54.9
Department Manager	233	32.3
Others	92	12.8
Total	721	100.0

Companies were asked to imagine that their company was invited by a client to use an electronic procurement tool, and to classify the intention of their adoption. Figure 3 shows that the majority of the respondents were open to future initiatives of e-Procurement.

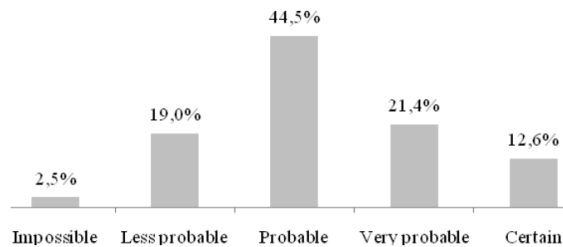


Figure 3. Intention to adopt e-Procurement

The supplier's perception about the benefits of e-Procurement plays a major role in e-Procurement, starting with the decision to go for e-Procurement. Table 6 shows that companies strongly agree that the adoption of e-Procurement will contribute to: achieve a better operational efficiency, reduce order processing costs and provide gains in competitive advantage. However, respondent companies are in average less optimistic about benefits such as improved relationship with clients, negotiable transparency and sales growth.

Table 6. Perceived benefits.

Perceived benefits	Strongly disagree.	Disagree	Uncertain	Agree	Strongly agree
Sales growth	2.6	7.6	32.3	46.0	11.4
Reach new markets	1.5	6.7	25.5	51.7	14.6
Reductions in order processing costs	1.7	5.1	19.3	49.9	24.0
Better operational efficiency	1.4	3.6	11.9	55.5	27.6
Better negotiable transparency	2.5	8.9	34.1	40.5	14.0
Improved rel. with clients	2.5	10.8	27.9	46.0	12.8
Gain of comp. advantage	1.7	4.2	22.2	52.7	19.3

The concerns of companies regarding the adoption of e-Procurement have a tremendous influence on its success. Companies were asked what factors could prevent them from adopting e-Procurement (Table 7). Some companies strongly agree with the lack of information security. However, companies agree that the integration costs and maintenance of a new system are the main impediments against the adoption of e-Procurement. The majority of respondents disagrees or strongly disagrees that price reduction pressures and implementation costs were causes for not implementing e-Procurement.

Table 7. Perceived barriers.

Perceived barriers	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Price reduction pressures	5.4	27.7	39.0	24.3	3.6
Implementation costs	5.1	30.7	33.6	27.0	3.6
Integration costs and maintenance	1.7	13.3	25.0	51.0	9.0
Lack of interoperability between systems	1.5	17.5	26.9	45.8	8.3
Lack of legal support	1.8	19.1	23.0	49.5	6.5
Lack of information security	3.3	21.1	21.1	41.7	12.8
Lack of skill and knowledge	4.4	25.1	25.1	37.4	7.9

The respondents were asked what they saw as being critical for their successful adoption and use of e-Procurement (Table 8). The integration with current systems and initial training has been viewed as critical. Top management support and business process reengineering have also been considered as important by the majority of the

respondents. However, in comparison to the other factors they were considered the less critical.

Table 8. Critical Success Factors

CSF	Unimportant	Less important	Important	Very important	Critical
Initial training	1,0	3,1	31,1	24,3	40,6
Integration with current systems	0,7	3,2	27,3	25,8	43,0
Top management support	1,5	4,6	29,0	30,8	34,1
Business process reengineering	2,4	8,3	36,3	34,0	19,0
Adoption process support	1,4	3,2	28,4	32,0	35,0

The influence of business partners plays a crucial role in e-Procurement adoption. About 74.8% of the respondents admitted to have some kind of influence from business partners to use e-Procurement tools (Table 9).

Table 9. Business partner influence.

Business partner influence	Frequency	%
No influence	182	25.2
Some business partners have recommended us to use e-Procurement.	315	43.7
Some business partners have requested us to use e-Procurement	172	23.9
Majority of business partners have requested us to use e-Procurement	52	7.2

4.2 Validity, Reliability and Correlation

As a first step, we performed a factor analysis (FA) of multi-item indicators to reduce the number of variables of the survey and to evaluate the validity. We used the principal component technique with varimax rotation (see Table 10) to extract five eigen values, which were all greater than one. The first five factors explain 64.4% of variance contained in the data. The Kaiser-Meyer-Olkin (KMO) measures the adequacy of sample; general KMO is 0.83 ($KMO \geq 0.80$ is good [43]), which reveals that the matrix of correlation is adequate for FA. The KMO for individual variables is also adequate. All the factors have a loading greater than 0.50. This indicates that our analysis employs a well-explained factor structure. The five factors found are: direct perceived benefits, indirect perceived benefits, perceived barriers of price and costs, perceived barriers and CSF. The factors obtained are in accordance with the literature review. However, there are two variables (perceived benefits and perceived barriers) for which the FA suggests two factors instead one. This reveals that the items of perceived benefits don't have the same factor. These items can be divided into direct and indirect perceived benefits in accordance with other authors [9].

Reliability measures the stability of the scale based on an assessment of the internal consistency of the items measuring the construct. It is assessed by calculating the composite reliability for each composite independent variable. Most of the

constructs have a composite reliability over the cut off of 0.70, as suggested by Nunnally [44]. All constructs have Cronbach's alpha value higher than 0.70, except perceived barriers of price and cost. For this reasons we excluded this factor from our analysis.

Table 10. Factor Analysis.

	Factors				
	1	2	3	4	5
Direct perceived benefits (Alpha = 0.836)					
Sales growth	0.09	0.24	-0.02	0.86	0.09
Reach new markets	0.11	0.21	0.05	0.85	0.07
Indirect perceived benefits (Alpha = 0.816)					
Reductions in order processing costs	0.15	0.77	0.01	0.06	0.10
Better operational efficiency	0.17	0.83	0.05	0.08	-0.05
Better negotial transparency	0.15	0.73	-0.01	0.17	0.06
Improved relationship with clients	0.17	0.61	0.00	0.33	-0.11
Gain of competitive advantage	0.22	0.55	0.05	0.51	-0.07
Perceived barriers of price and costs (Alpha = 0.482)					
Price reduction pressures	0.04	0.05	0.03	0.16	0.79
Implementation costs	-0.02	-0.08	0.34	-0.06	0.68
Perceived barriers (Alpha = 0.768)					
Integration costs and maintenance	0.12	0.03	0.54	-0.02	0.41
Lack of interoperability between systems	0.06	0.12	0.67	-0.10	0.35
Lack of legal support	0.04	0.07	0.78	-0.10	0.16
Lack of information security	0.04	-0.06	0.76	0.06	-0.07
Lack of skill and knowledge	0.08	-0.03	0.71	0.18	-0.01
CSF (Alpha = 0.875)					
Initial training	0.81	0.04	0.15	0.08	-0.05
Integration with current systems	0.82	0.12	0.12	-0.01	-0.01
Top management support	0.79	0.22	-0.01	0.05	-0.01
Business process reengineering	0.73	0.21	0.02	0.18	0.12
Adoption process	0.83	0.18	0.02	0.08	0.06

The results of the spearman's rank correlation test are shown below in Table 11. Spearman's rank correlation coefficient is used as a measure of linear relationship between two sets of ranked data [45]. Spearman's rank correlation coefficient (ρ) will take a value between -1 and +1. A positive correlation is one in which the ranks of both variables increase together. A negative correlation is one in which the ranks of one variable increase as the ranks of the other variable decrease [46]. Once the value of the difference is significant, that is, its p-value below 0.05, we consider that there is a statistically significant relationship between each of the factors (obtained by factor analysis) and the intention to adopt e-Procurement. The perceived indirect benefits and business partner influence are the most correlated factors.

Table 11. Correlation between perceived factors and business partner influence with the intention to adopt e-Procurement by suppliers.

	Spearman's rank correlation	
	ρ	p-value
Perceived direct benefits (obtained by FA)	0.163	< 0.0001
Perceived indirect benefits (obtained by FA)	0.335	< 0.0001
Perceived barriers (obtained by FA)	-0.108	0.0036
CSF (obtained by FA)	0.119	0.0013
Business partner influence (obtained directly from survey)	0.334	< 0.001

4 Conclusions

Among several factors associated with the success of e-Procurement implementation, supplier's adherence to such platforms has been regarded as critical. Two main types of supplier perceived benefits were identified with the FA: direct benefits and indirect benefits. Direct benefits are associated with marketing and sales and represent an opportunity for the company to generate financial gains in the short term. Indirect benefits are related to benefits obtained in the medium and long term that may not directly result in financial gains, but may contribute to improvements on the organizational performance and sustainability of the company. The recommendations are that companies need to explain to their suppliers the real benefits of adopting e-Procurement. Thus it is necessary to develop a communication plan in order to increase the benefits awareness both in the short and mainly in the long term.

As shown, the barriers have a negative impact on the intention to adopt e-Procurement. The main barriers are the costs of integration and maintenance as well as the lack of legal support. Suppliers generally do not consider that e-procurement leads to a decrease in selling prices. Some informal comments also suggested that the lack of "human interaction" in e-Procurement is not suitable for some types of business, especially in complex products that require significant human interaction. As affirmed by Kothari et al. [32], no advanced technology can replace human interactions in establishing and maintaining business relationships.

All the critical success factors were considered very important in implementing e-Procurement. Less importance was given to business process reengineering. One possible cause is the lack of experience with e-Procurement by business respondents. Compared with benefits and business partner pressure, CSF is less correlated with supplier intention to adopt e-Procurement.

Business partner pressure has a positive and significant influence on the adoption of e-Procurement by suppliers. This is consistent with other studies on technology adoption. For example Chwelos *et al.* [40] showed that the pressure from business partners in the adoption of EDI contributes more than the perceived benefits of those who will adopt. However, through our analysis we can conclude that the influences of business partners and the indirect benefits have similar importance on e-Procurement adoption.

It is important that future works solve some of the limitations of this study and contribute to the advancement of this area. Some of the factors identified in the literature review were related to the adoption of e-Procurement in a general way and not specifically related to supplier adoption on buyer centric e-Procurement systems. Finally, the respondents from our study were from Portuguese companies. Future studies might explore the differences between Portugal and other countries, or between the industries analysed. This way and to finalize, we are convinced that companies and their business partners can take full advantage of their investments in e-Procurement by looking at supplier adoption.

References

1. Cagno, E., Giulio, A.D., Trucco, P.: State-of-art and development prospects of e-procurement in the Italian engineering & contracting sector. *Project Management Journal*, vol. 35, pp. 24-29 (2004)
2. Gershon, P.: Review of civil procurement in central government Technical report, HM Treasury 1999
3. Pereira, P. and B. Alturas: Factores Críticos da Adesão das PME'S Nacionais, Fornecedoras de Materiais de Escritório ao Procedimento Aquisitivo Público em Portugal: Uma Proposta de Investigação. In: Conferência IADIS Ibero – Americana (2007)
4. Vaidya, K., Sajeev A.S.M., & Callender, G. : e-Procurement Initiatives in the Public Sector: An Investigation into the Critical Success. In: Annual International Purchasing & Supply Education & Research Association (IPSERA), Catania, Italy (2004)
5. Benton, P.: E-Procurement's Missing Link. *IT Adviser* (2005)
6. Davila, A., M. Gupta, and R. Palmer: Moving procurement systems to the internet: the adoption and use of e-procurement technology models. *European Management Journal*, vol. 21, pp. 11-23 (2003)
7. EC: Overview of International e-Business Developments Technical report, European Commission 2005
8. Gunasekaran, A., et al.: E-Procurement adoption in the Southcoast SMEs. *International Journal of Production Economics*, vol. 122, pp. 161-175 (2009)
9. Gunasekaran, A. and E.W.T. Ngai: Adoption of e-procurement in Hong Kong: An empirical research. *International Journal of Production Economics*, vol. 113, pp. 159-175 (2008)
10. Soares-Aguiar, A. and A. Palma-Dos-Reis: Why do firms adopt e-procurement systems? Using logistic regression to empirically test a conceptual model. *IEEE Transactions on Engineering Management*, vol. 55, pp. 120-133 (2008)
11. Sharifi, H., D.F. Kehoe, and J. Hopkins: A classification and selection model of e-marketplaces for better alignment of supply chains. *Journal of Enterprise Information Management*, vol. 19, pp. 483-503 (2006)
12. Beall, S., et al.: The role of reverse auctions in strategic sourcing Technical report, CAPS Research 2003
13. Ellram, L.M. and G.A. Zsidisin: Factors that drive purchasing and supply management's use of information technology. *IEEE Transactions on Engineering Management*, vol. 49, pp. 269-281 (2002)

14. Wong, C. and B. Sloan: Use of ICT for e-procurement in the UK construction industry: a survey of SMES readiness. In: ARCOM Twentieth Annual Conference, pp. 620-628 (2004)
15. Berlak, J. and V. Weber: How to make e-Procurement viable for SME suppliers. *Production Planning & Control*, pp. 15-22 (2004)
16. Moser, E.P.: E-Procurement-Reverse Auctions and the Supplier's Perspective. *Pharmaceutical Technology*, vol. 26, pp. 82-85 (2002)
17. Neef, D.: e-Procurement: From Strategy to Implementation. Prentice Hall, USA (2001)
18. Carayannis, E.G. and D. Popescu: Profiling a methodology for economic growth and convergence: learning from the EU e-procurement experience for central and eastern European countries. *Technovation*, vol. 25, pp. 1-14 (2005)
19. Croom, S. and A. Jones: Impact of e-procurement: Experiences from implementation in the UK public sector. *Journal of Purchasing and Supply Management*, vol. 13, pp. 294-303 (2007)
20. AGIMO: Case Studies on E-procurement Implementations: Italy, New South Wales, New Zealand, Scotland, Western Australia Technical report, Australian Government Information Management Office 2005
21. Croom, S.: Restructuring supply chains through information channel innovation. *International Journal of Operations and Production Management*, vol. 21, pp. 504-515 (2001)
22. EC: The European e-Business Report 2008 - The impact of ICT and e-business on firms, sectors and the economy Technical report, European Commission 2008
23. Kumar, N. and Q. Peng: Strategic alliances in e-government procurement. *International Journal of Electronic Business*, vol. 4, pp. 136-145 (2006)
24. Hawking, P., et al.: E-procurement: is the ugly duckling actually a swan down under? *Asia Pacific Journal of Marketing and Logistics*, vol. 16, pp. 3-26 (2004)
25. Koorn, R., D. Smith, and C. Müller: e-Procurement and Online Marketplaces. The Netherlands: Compact (2001)
26. Tanner, C., et al.: Current Trends and Challenges in Electronic Procurement: An Empirical Study. *Electronic Markets*, vol. 18, pp. 6-18 (2008)
27. Teo, T.S.H. and C. Ranganathan: Adopters and non-adopters of business-to-business electronic commerce in Singapore. *Information & Management*, vol. 42, pp. 89-102 (2004)
28. Kim, J.-I. and D.L. Shunk: Matching indirect procurement process with different B2B e-procurement systems. *Computers in Industry*, vol. 53, pp. 153-164 (2004)
29. Eadie, R., et al.: Drivers and Barriers to Public Sector e-Procurement within Northern Ireland's Construction Industry. *ITcon*, vol. 12, pp. 103-120 (2007)
30. Julia-Barcelo, R.: Electronic contracts: a new legal framework for electronic contracts: the EU electronic commerce proposal. *Computer Law & Security Report*, vol. 15 (1999)
31. Archer, N., S. Wang, and C. Kang: Barriers to the adoption of online supply chain solutions in small and medium enterprises. *Supply Chain Management: An International Journal*, vol. 13, pp. 73-82 (2008)
32. Kothari, T., C. Hu, and W.S. Roehl: e-Procurement: an emerging tool for the hotel supply chain management. *International Journal of Hospitality Management*, vol. 24, pp. 369-389 (2005)
33. TIBCO: The Case for Business Process Management. (2008)

34. OGC: eProcurement in action: A guide to eProcurement for the public sector Technical report, Office of Government Commerce 2005
35. Panayiotou, N.A., S.P. Gayaialis, and I.P. Tatsiopoulos: An e-procurement system for governmental purchasing. *International Journal of Production Economics*, vol. 90, pp. 79-102 (2004)
36. Pani, A.K. and A. Agrahari: *E-Procurement in Emerging Economies: Theory and Cases*. Idea Group Pub., India (2007)
37. Gilbert, A.: E-procurement: problems behind the promise. *InformationWeek*, pp. 48-62 (2000)
38. Corini, J.: Integrating e-procurement and strategic sourcing. *Supply Chain Management Review*, vol. 4, pp. 70-75 (2000)
39. Iacovou, C., I. Benbasat, and A. Dexter: Electronic data interchange and small organizations: adoption and impact of technology. *MIS quarterly*, pp. 465-485 (1995)
40. Chwelos, P., I. Benbasat, and A.S. Dexter: Research report: Empirical Test of an EDI Adoption Model. *Information Systems Research*, vol. 12, pp. 304-321 (2001)
41. Grandon, E.E. and J.M. Pearson: Electronic commerce adoption: an empirical study of small and medium US businesses. *Information & Management*, vol. 42, pp. 197-216 (2004)
42. Teo, T.S.H., S. Lin, and K.-h. Lai: Adopters and non-adopters of e-procurement in Singapore: An empirical study. *Omega*, vol. 37, pp. 972-987 (2009)
43. Sharma, S.: *Applied Multivariate Techniques*. John Wiley & Sons, USA (1996)
44. Nunnally, J. and I. Bernstein: *Psychometric theory* (1978)
45. Hill, M.M. and A. Hill: *Investigação por Questionário*. Edições Silabo (2008)
46. Altman, D.G.: *Practical Statistics for Medical Research*. Chapman & Hall, London (1991)

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