

## DOES THE BUYER'S EXPERTISE INFLUENCE THE RESULT OF A REVERSE ELECTRONIC AUCTION? AN EXPERTISE THEORY POINT OF VIEW

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### Abstract

This paper offers a new perspective on factors influencing the results of reverse electronic auctions (e-auctions) in purchase. Using the expert-performance approach established by Ericsson and Towne [1], we examine the claim by Smeltzer and Carr [2] that qualified and experienced buyers tend to perform better in e-auctions. Financial savings are used as the measure of the performance. Repeated execution of e-auctions, practitioner's conference participation and positive feedback from supervisors are considered to be the factors of 'deliberate practice' described in Ericsson and Towne [1]. ANOVA and correlation is used as a statistical method to examine the data from e-auctions conducted by Czech and Slovak organizations. We conclude that expertise influences the results of e-auctions and mainly the factor of coaching and mentoring can enhance company's performance.

**Keywords:** Reverse electronic auctions, expert-performance approach, deliberate practice, expertise in purchase

### 1. INTRODUCTION

In recent years, e-procurement methods changed the industrial purchasing. Companies and public institutions can benefit from new forms and methods using the means of information technology. One of those methods are reverse electronic auctions (e-auctions). If done right, e-auctions can bring significant financial savings and other benefits to the organization (for example Kaplan et al, [3], Mabert and Skeels, [4]). However, the e-auctions efficiency varies depending on many factors, such as purchasing category, lot size, or number of suppliers. In this paper, we present a new factor: the expertise of a buyer. The idea is that buyer with more expertise should be able to make the decision whether to use e-auction for given procurement case, use the right e-auction type and rules, and attract the right number of suppliers.

We propose to use the expert-performance approach (Ericsson and Towne, [1]) to examine this potential influence. This approach examines the essence of superior behavior of experts in their domain. The goal of this paper is to define what makes an expert in purchasing and the objective measure for level of success in these e-auctions, and to use the sample data from Czech and Slovak e-auctions to conclude whether the varying levels of expertise of the purchasers influence the results.

### 2. LITERATURE OVERVIEW

#### 2.1. E-auctions

E-auctions can be defined as 'an online, real-time auction between a buying organization and two or more invited suppliers, where suppliers can submit multiple bids during the time period of the auction, and where some degree of visibility exists among suppliers regarding the actions of their competitors' (Beall et al, [5]).

E-auctions can generate valuable financial savings through the mechanism of competitive bidding, as the suppliers directly bid against each other. Wagner and Schwab [6] show that over 65 % of e-auctions studied deliver more than 5 % savings, which is seen as threshold of success by authors (also by Kaplan et al [3]). Apart from the obvious financial savings, other e-auction benefits can be defined as process transparency,

supply guarantees, access to larger supplier base and time savings for all stakeholders (Manoochechri and Lindsay, [7]).

The critics of e-auctions point out that e-auctions focus solely on the purchase price, often ignoring other important purchasing factors such as quality or services (Hartley et al, [8]), suggesting e-auctions suitability only for easy-to-define commodities (Tassabehji et al, [9]). Teich et al [10] provide contrasting evidence: high engineered and complex items generally perform better in e-auctions, as the supplier's margins on commodities are already low and cannot be lowered much more in the e-auction process. Complex items tend to have higher added value, therefore more space for savings. Moreover, Schoenherr and Mabert [11] convincingly argue that based on empirical research, the complaints about e-auctions are more of a myth than reality and e-auctions are very powerful tool, if used right.

The results of e-auctions vary depending on many factors. Klézl and Vašek [12] build on research by Wagner and Schwab [6] and Beall et al [5] and show perhaps the most comprehensive list of factors, split into two categories: e-auction process related factors and purchase category related factors. The first group consists of factors that are immediately affected by the purchasing organization, such as organization infrastructure, e-auction design and number of suppliers participating. The second group is more market-related, with less input from the company. Ease of item specification, competition intensity and switching costs are amongst those factors.

Smeltzer and Carr [2] propose an influencing factor that could be easily related to expertise: appropriate organization infrastructure. The authors claim that successful application of the reverse auctions in the purchasing process requires 'sophisticated set of skill and knowledge'.

## 2.2. Expertise definition and approach

Expertise is generally defined as a skill, knowledge or opinion possessed by an expert, allowing him or her to perform better in his field (Ericsson and Towne, [1]). Originally, researchers understood the expertise solely by the amount of accumulated experience in the domain, and 10 or more years of experience were seen as enough to reach the status of an expert. These models were later proven to be problematic, as current research shows that the process of acquiring expertise is not linear and varies from one person to another (Ericsson, [13]).

Ericsson and Towne [1] suggest these steps in measuring the level of expertise in a certain field: first, we have to find a measure of success (1), then we examine the mechanisms which mediate the expert's performance (2). The authors cite the example of competitive chess, where the performance cannot be measured directly (as in other sports such as running), as every game consists of different consequences of actions. Therefore, the expert-performance approach was developed by Ericsson and Smith [14], where players are presented with the same situations and asked to select the best move.

The main component of expert performance is then defined by Ericsson and Towne [1] as a '**deliberate practice**' - full concentration on improving a specific aspect of performance during practice activities requiring full concentration, modifying the mechanisms responsible for improvement, as opposed by mere executing the same performances automatically. Other factors affecting the deliberate practice are **informative feedback** and subsequent correction of non-optimal decisions, and repetition of optimal decisions, and **coaching or mentoring**, where challenging tasks are practiced appropriately (Ericsson et al, [15]).

## 2.3. Expertise theory in supply chain management

To the best of our knowledge, the expert-performance approach is yet to be used in the field of purchasing and supply chain management. Spina et al [16] presents comprehensive list of most used organizational theories in this field, with Transaction cost economics, Contingency theory and Resource-based view cited as

the most often used theories (Spina uses the term 'External grand theories' - established and well researched theories already developed in other management, economic and other social sciences fields).

Perhaps the closest theory to the one presented in this paper is Knowledge-based theory, which focuses on knowledge as the key resource for the company. The firm creates, integrates and applies knowledge across buyer-supplier relationships and uses it as a source of competitive advantage. The purchasing knowledge should then have an impact on purchasing performance (Kogut and Zander, [17]).

Tazelaar and c examine the expertise in purchasing, using the narrower definition of expert as 'purchasing professionals with experience'. They therefore omit the other makings of an expert (aforementioned coaching or informative feedback). The authors conduct an experiment, where experts and non-experts are given certain procurement cases description and are asked to perform some tasks, such as predicting the probability of problematic transaction. Performance of both groups is then compared with computer model prediction. Quite surprisingly, the experts perform the worst of the three groups, with students being second and computer formula outperforms both of these groups. The authors note that the reason for this counter-intuitive finding might be the fact that experts consider different characteristics (factors) to be important than non-experts, rely too much on their own experience, and tend to use less information to make a decision. The authors suggest combining the experts' opinions with the computer model, or using a committee of experts to make important purchasing decisions.

### 3. MEASURING THE EXPERTISE AND PERFORMANCE IN E-AUCTIONS FIELD

#### 3.1. Expertise in the terms of e-auctions

As mentioned in 2.3, expert-performance approach is new to the field of e-auctions. Therefore, we need to specify how one becomes an expert. This is based on Ericsson et al [15] and Ericsson and Towne [1] and their framework of 'deliberate practice'. According to this framework, superior performance (expertise) is improved and maintained when individuals are given tasks with well-defined goals, are given feedback, have appropriate opportunities for repetition, and receive coaching and mentoring.

**Opportunity for repetition** is perhaps most easily defined: continuous use of e-auctions allows one to gain experience and knowledge on e-auction settings and types (this factor is the most aligned with the basic definition of expertise as simple experience). The purchaser then knows what categories are suitable for e-auctions, what e-auction type is the best for given item and can evaluate the case better. **Given feedback** is defined as the response to the results of e-auction use and their perception and acknowledgement by purchaser's supervisors. If they see e-auctions as beneficial for the company, they will encourage their further use and allow the purchaser to gain even more experience. **Coaching and mentoring** could be specified as participation on practitioner's conferences and other forms of practical education such as e-learning supplied by the e-auction provider (again, the purchaser is more likely to participate on the conferences if he receives positive feedback). **Well defined goals** seem to be more difficult to define and even harder to measure: as e-auctions are generally seen as transaction purchasing method, their goal should always be cost (financial) saving. If e-auctions are applied on purchasing case more suitable for relational methods, possible conflict of goals arises, as there is pressure to fulfil both relational and transactional goals.

#### 3.2. E-auctions performance measurement

Janke and Kubačka [19] deal with the issue of measuring the success (performance) of e-auctions. They conclude that other benefits than financial savings are very hard to measure, as we lack quantitative data. Therefore, financial savings are the most comprehensive method. Two ways of computing the financial savings exist: savings based on estimated price and savings based on initial price. The estimated price is usually based on the purchase price of the auctioned item before the e-auction, or set as an educated guess of the purchaser. The initial price is the lowest bid after the first round of the e-auction, where all the invited suppliers are asked

to submit a first bid, which is then lowered in the e-auction process itself. The authors (Janke and Kubačka, [19]) conclude that both methods of measurement are suitable for measurement of performance and highly correlated. For the purpose of this article, we use the savings based on estimated price.

#### 4. EXAMINING THE INFLUENCE OF EXPERTISE ON PERFORMANCE

In this part of the article, we discuss the research methodology and present the analysis of expertise influence on e-auction performance. The study is based on real data from e-auctions conducted by Czech and Slovak companies in the Proe.biz e-auction system in years 2011-2014. Through the method of purposeful sampling, 10 companies with varying level of expertise were selected. In the case of this study, we have available data on two factors of expertise: the experience, measured by number of e-auctions conducted, and coaching and mentoring, measured by practitioner's conference attendance and participation on e-learning courses offered by e-auction software provider. We are not able to test the influence of given feedback and goal specificity in this study, as we would need more inputs from the conducting companies.

Each e-auction case in the sample is defined by several variables, including the savings reached in the auction. We are therefore able to analyse whether the savings vary amongst companies with different level of expertise. We use the method of Kruskal-Wallis ANOVA to test the effect of coaching and mentoring, and Spearman's rank correlation to test the effect of experience. These non-parametric methods had to be used as the savings variable is not normally distributed. Software IBM SPSS Statistics 21 was used for this research. Due to the data sensitivity, no company can be named or otherwise described in the research.

##### 4.1. The influence of experience

As mentioned in chapter 3.1, we see e-auction experience as a factor best suitable for measuring the level of opportunity for repetition. Here, we measure the correlation of experience (total number of e-auctions by the company in years 2011-2014) and the relative savings based on previous price. The result of the test can be seen in Table 1.

**Table 1** Spearman correlation - Experience and e-auction result

Variables	Sig.	Spearman's rank correlation value
Experience, e-auction result	0.00	-0.277

The result of Spearman's rank correlation test shows statistically significant (Sig value is lower than 0.05) correlation between the two variables. The correlation value is negative (-0.277), meaning more experienced companies who do more e-auctions tend to have worse performance. The effect of experience is clearly outweighed by other factors influencing the result, such as results sustainability, cited for example by Beall et al [5]. This finding also aligns with the results of aforementioned study by Tazelaar and Snijders [18].

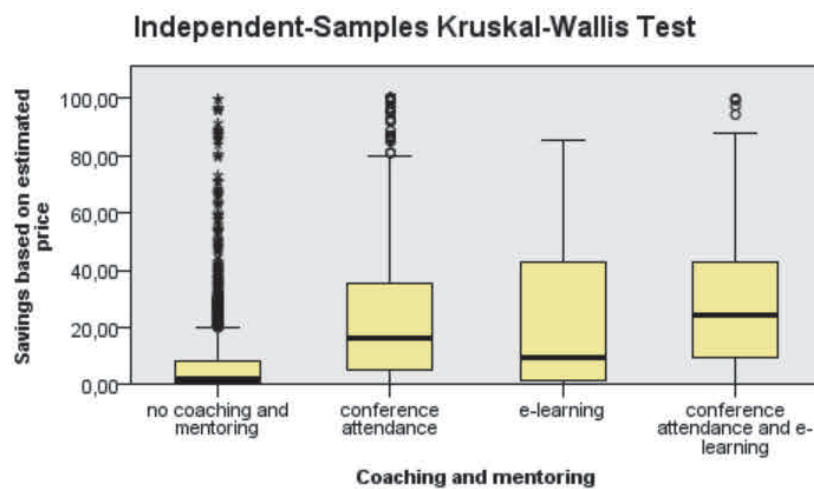
##### 4.2. Coaching and mentoring

As mentioned in chapter 3.1, coaching and mentoring is defined as participating on practitioner's conference and e-learning offered by e-auction SW provider. In this case, we divided the companies into four groups (see Table 2). In first group, we used companies with no coaching or mentoring in the field of e-auctions, companies who attend practitioner's conference were in the second group, companies who use e-learning in the third group and finally, in the fourth group we added one company using both conferences and e-learning.

**Table 2** Companies split into groups by the variable coaching and mentoring

Group	Coaching and mentoring	Number of companies
1	No coaching and mentoring	5
2	Conference attendance	3
3	E-learning	1
4	Conference and e-learning	1

Then we compared these four groups using Kruskal-Wallis ANOVA to test whether the medians of savings differ at least amongst two of these groups, finding that with the significance of 0.00, the distribution of Savings differs for at least two groups. You can see the box-plot chart for the distribution of Savings amongst the groups on the Fig. 1.


**Fig. 1** Kruskal-Wallis test for Savings grouped by the variable Coaching and mentoring

The companies that use both methods of coaching and mentoring in their e-auction practice tend to have much higher median of savings than companies not using any method. This is in alignment with the postulates of Ericsson and Towne [1].

## 5. CONCLUSION

The goal of this article was to apply the expert-performance approach on the field of e-auctions. We apply the factors making an expert proposed by Ericsson and Towne [1] and empirically test two of these factors: experience, and coaching and mentoring. We find that with repeated e-auctions, e-auction performance deteriorates, while applying some form of coaching and mentoring leads to better results.

We argue that in the case of experience influence, the effect of repeated e-auction, which generally tends to have lower savings (as explained by Beall et al [5]) outweighs the effect of better performing purchaser. However, it seems that if the purchaser is getting coaching and mentoring, he performs much better, reaching higher savings. This confirms the assumption of Smeltzer and Carr [2] - coaching enables the purchasing side to reach better organizational infrastructure.

The limitation of this paper is the lack of data to test on other factors making an expert: the clear goal definition and supervisor's feedback. One could argue that the continuous use of e-auctions is a sign of positive feedback and cost saving-oriented purchasing strategy, but a qualitative research is needed in this area.

## ACKNOWLEDGEMENT

*This paper is supported by Student Grant Competition of the Faculty of Economics, VŠB-Technical University of Ostrava (project registration number: SP2015/93). All support is greatly acknowledged and appreciated.*

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