

# EVALUATING eREVERSE AUCTIONS (EeRA): A RESEARCH NOTE

Zahir Irani, Information Systems Evaluation and Integration Network Group (ISEing) School of Information Systems, Computing & Mathematics, Brunel University, UK

[Zahir.Irani@brunel.ac.uk](mailto:Zahir.Irani@brunel.ac.uk)

Tony Elliman, Information Systems Evaluation and Integration Network Group (ISEing) School of Information Systems, Computing & Mathematics, Brunel University, UK

[Tony.Elliman@brunel.ac.uk](mailto:Tony.Elliman@brunel.ac.uk)

Ray Hackney, Business School, Manchester Metropolitan University, UK

[R.hackney@mmu.ac.uk](mailto:R.hackney@mmu.ac.uk)

## Abstract

This eGISE network paper seeks to evaluate issues relating to the implementation of electronic reverse auctions (eRA) within local government procurement processes. The adoption of an eRA invites pre-qualified suppliers to compete with each other for a specified good or service. Consequently, there is a unique opportunity for the buyer to receive a reduced cost through the successful bidder. However, the literature identifies a number of adverse effects within these arrangements depending upon the nature of the buyer/supplier relationship. The objectives of the research involves identifying a set of business scenarios to demonstrate the impact of different eRA strategies in this respect. This will be achieved through a structured case analysis approach to enable qualitative data to be modelled through a visual toolset simulation. It is believed the outcome of the investigation will provide valuable insights into the complexities associated with the eProcurement process.

**Keywords:** *electronic, reverse, auctions, local, government, simulation, models*

## 1 INTRODUCTION

Many private sector organisations (e.g. BMW, Nestlé, Kimberly & Clarke) and public sector organisations (e.g. NHS, Universities) use e-reverse auctions (e-RAs) in an attempt to achieve direct cost reductions of externally sourced goods (B2B Research Centre, 2003; Wagner and Schwab, 2004). In e-RAs, the purchaser invites pre-selected suppliers who compete against each other to supply a specified good or service thus, driving down the supply price through direct competition (De Boer et al., 2002). The potential savings are significant typically ranging from 5% to 30%, or in some cases even more far reaching (Barling, 2001; Beall et al., 2003; Sashi and O'leary, 2002; Turbin et al., 2000). However, recent studies report potential adverse effects within the eRA process relating to the specific characteristics of the transaction (Jap, 2002;2003; Beall et al 2003). This EeRA research will address these issues.

## 2 THE PROBLEM DOMAIN

Given year-on-year cost saving demands on the public sector to reduce operating costs through more efficient purchasing strategies (Gershon, 2004; Office of the Deputy Minister (ODPM), 2003), e-RAs represent a viable strategy to support objectives. However, in spite of the perceived cost saving benefits, recent studies (e.g. B2B Research Centre, 2003; Beall et al., 2003; Emiliani, 2006; Jap, 2002; 2003) suggest some deficiencies in the e-RAs process. Emiliani, (2006, p.6) points out that 'poor sourcing decisions, higher costs, and less cooperative supplier relationships are a common result of e-RAs – the opposite of what buyers hoped to achieve from e-RAs'. Lapedra et al. (2004), for instance, found that suppliers who had won an e-RA by bidding below their margins could quickly recover these initial losses in later negotiations therefore questioning the predictive value of the bidding process. The consequence of this is that buyers may actually pay more in total cost of purchase than they would have done if they had chosen one of the more realistic supplier bids (Lapedra et al., 2004). Kern and Willcocks (2002) found that most buyers and suppliers realise the importance of adequate communication and information exchange for efficient buyer-supplier interaction but actually fail to address the criticality of this dimension in their relationships. The authors point out that "[t]o ensure good communication was not an easy process. It often needed through planning of an appropriate communication structure, which few [participants] actually had done." (Kern & Willcocks, 2002, p.14) This is critical in relation to the generation of equitable buyer-supplier relationships within the Public Sector that has identified e-reverse auctioning as a potential cornerstone of its efficiency pursuits.

### 2.1 SOLUTION: A WAY FORWARD

eReverse Auctions emulate closely and addresses specifically the stated intention for a European Action Plan towards an information society, the so called 2010 project as detailed in the Lisbon agreement. The nature and scope of these initiatives relate primarily to an evaluation of the eProcurement processes used within the public sector through the adoption and diffusion of eRAs. However, the 2010 framework remains prescriptive and lacks description on how eRA should be embraced as realistic strategies and options to traditional tendering. In seeking to evaluate the scalability of eRA through developing appropriate criteria to support management decision making, EeRA seeks funding from EPSRC with the aim to:

Develop a comprehensive set of business scenarios that are in acted through dynamic simulation models, which demonstrate the impact of different eRA strategies in support of eGovernment.

The grounding associated with the facilitation of eGovernment will be through a framework encapsulated from systems evaluation factors that reflect the reasoning, motivations and preferences of professionals engaged in buyer/supplier relationships. Consequently, EeRA will identify a set of effective factors, including product type, key informants, market conditions, process issues, supplier management, for e-RA efficiency gains to be achieved.

### 3 RESEARCH OBJECTIVES

EeRA will demonstrate through the development of a visual toolset of dynamic simulation models that local authorities and other public sector organisations can make informed cost-effective procurement decisions at strategic, tactical and operational levels. This is made possible through the identification and simulation of weighted criteria supportive of procurement transformation relative to policy driven change driven by a national mandate. The objectives that will support the achievement of EeRA are:

- 1) To formulate a taxonomy of organisational, human and technical interventions for successful eReverse Auctions.
- 2) To develop cause-effect models that relate to buyer/supplier relationships derived from the taxonomy developed in 1) and their effects (third, fourth, and higher order).
- 3) Develop portfolio of cause-effect animation scenarios using system dynamic modelling together with supporting interfaces.
- 4) Deliver and evaluate a simulation workbench that is populated by a library of simulation models that *demonstrate the impact of different eRA strategies* in support of eGovernment.

The EeRA research will be experimental with embedded evaluation resulting in good practice that can be disseminated – it will in effect promote *inclusion by design*.

#### 3.1 RESEARCH CONTEXT

Traditional eRA processes comprise of four key stages; opportunity assessment, market making, transaction and implementation, which are fully recordable for issues of traceability and transparency. eRA can be quick to instigate, have a potentially low entry cost and encourage good procurement practice. Whilst eRA are not necessarily indications of procurement excellence, they can be a catalyst to support the introduction and continued operation of best practice and benchmarking. Arrowsmith, (2002) argues that eRA should to take place in the context of good procurement practice and EU procurement rules therefore harmonising practice across Europe. A reduction in the purchase price of goods and / or services is the main component of a business case for the use of eRA, especially given the Best Value initiative used within the public sector. Such a reduction in cost can occur in real-time through competitive bidding between suppliers, in a similar way to eBay through peer-to-peer models. This can be through improved pricing terms for spot purchase or for the duration of the contract for longer term strategic agreements. It is not always however true that the cheapest price is the best deal. Factors other than price need to also be considered, such as quality, delivery, product warranty, service and specification.

Whilst many eRA are used as price reduction strategies, only such an approach can use a blended weight bidding format for combinations of these criteria thus, ensuring that the best value (as determined by the purchaser) is attained. Effectively, the eRA process which is clearly dynamic provides reassurance that the organisation is buying at market rates rather than using traditional static tendering processes. Indeed, it has been argued by Beall et al.,

(2003) that eRA should be centrally managed with strong leadership to ensure effective choice and to realise the maximum levels of benefits through effective management of the people and process challenges.

### 3.1.1 THEORETICAL STANCE

Williamson's (1981) Transaction Cost Economics (TCE) appears to be the most commonly used theoretical background for the investigation of the efficiency of buyer-supplier relations (Olsen and Ellram 1997). It combines both behavioural aspects and the economic theory of the firm (Cousins 2002) thus, explaining the circumstances for forming different buyer-supplier relationships by acknowledging both the role of information and the context – a trait which proves particularly useful for this research.

According to Williamson (1975; 1981), there are two basic governance structures for organizations, namely, markets and hierarchies. As each governance structure is associated with certain transaction costs, the goal is to choose the most appropriate one, i.e. most efficient structure/relationship. The decision of the right governance structure/buyer-supplier relationship, however, does not only depend on contextual factors (e.g. the level of competition; the level of uncertainty; the frequency of the transaction; the level of transaction-specificity) (Williamson 1981). Behavioural factors such bounded rationality of the decision-maker or opportunism equally affect the decision by directly influencing the information available and that which is taken into account when making the decision. Consequently, the decision on the governance structure is never objective or complete but rather to a certain extent biased and limited (Williamson 1981). The basis of this argument, and indeed its relevance to EeRA, is the extent of subjectivity in buyer/supplier relationships. This situation is a result of the dynamics within business processes, which consequently requires significant formalisation through a scaleable methodology.

### 3.1.2 EXTENDING TRADITIONAL BUYER / SUPPLIER MODELS THROUGH EeRA

Within the literature, various classifications and models of buyer-supplier relationships have been suggested, with eRA being the latest. These models are all based on various criteria, facets, influencing factors, and outcomes. A review of 38 articles reveals several recurrent intrinsic and extrinsic characteristics of buyer-supplier relationships (e.g. Lamming *et al.* 1996). Intrinsic characteristics (e.g. commitment) tend to be regarded as inherent in any relationship and, describe the inner nature. Extrinsic characteristics (eg success) however, tend to represent certain outcomes or results of the relationship. The function of extrinsic characteristics is not merely descriptive but, directly judgmental in terms of indicating the general quality and efficiency of a relationship. However, Boddy *et al.* {1998} point out that it is far from clear how the performance of a relationship can be evaluated. Following the studies of Gibbs {1998} and O'Toole and Donaldson {2002}, reduced costs, delivery time, and the overall quality of the product are the most commonly used objective indicators for the effectiveness of buyer-supplier relationships. Lamming (1996), however, stresses that relationship assessment is not a one-sided, objective affair. It always needs to take into account both the buyer and the supplier's view. O'Toole and Donaldson (2002) found that

particularly intangible factors (such as satisfaction) play an important role for determining the actual performance of a relationship. Many authors (e.g. Mohr and Spekman 1994; Jap and Ganesan 2000) consider satisfaction as a crucial indicator for successful relationships. The level of conflict (e.g. Mohr and Spekman 1994; Jap and Ganesan 2000) appears to be another important indicator for successful buyer-supplier relationships. As the perception of the quality of a relationship is a very subjective affair (e.g. Lamming et al. 1996; Ambrose 2005), the quality and appropriateness of a relationship in this research will mainly be assessed by relying on the subjective indicators of perceived success, the level of satisfaction, and the level of conflict.

#### **4 POTENTIAL FOR INNOVATION**

It is argued that current development practice is mainly crisis driven, with little concern for the effect on the organisational structure or understanding of the benefits to citizens (Gronlund 2000). eRA is concerned with facilitating the management of change based upon systematic evaluations that reflect the reasoning and preferences of management professionals engaged in procurement auction activities, i.e:

- the most suitable interventions for eRAs
- the constraints and settings for buyer/supplier relationships
- the extent of efficiency gains associated with eRA change

A primary objective of the research will be to enable practitioners to relate specifically to their own organizational environments to conceptualise, consolidate and gain a deeper understanding of knowledge for eRA change. eRA will provide guidance for problem solving involved in these difficult organizational governmental contexts. As the public sector strives for improved efficiency and effectiveness it needs the management ability to monitor the effects of change and learn from existing practice. eRA's consolidated framework and worksheets for accessing relevant eRAs and evaluating cross-functional systems will provide an innovative methodology.

#### **5 METHODOLOGICAL APPROACH**

The investigators proposing eRA have found from their previous research that the notion of 'success' or 'failure' within the context of IS project is primarily attributable to the extent to which services meet user expectations. This underlines the significance of both the technology and 'soft' human and organisational issues involved in IS evaluation (Irani & Love 2001; Remenyi et al., 2000). Consequently, there is a need for a research methodology that involves and enfranchises both the organisation and its senior staff. Simulation models develop deeper understanding of complex systems not simply by inspection of the results but through direct participation in the process of model construction and experimentation. The models provide an opportunity to explore and enhance the decision-makers' understanding about decision-options, identify relevant factors and to establish how they affect strategic, tactical or operational decisions. To achieve this, technology now supports visual toolsets that interface with decision-maker not the simulation or software specialist therefore, increasing the accessibility of such decision-aids. Therefore, there is a need to develop appropriate visualisation components and to provide a library of models or templates appropriate. Figure 1 below, represents the methodological proposed by the investigative team, and mixes a

combination of qualitative and quantitative approaches, set against phased research: Research design, data collection and model building and, data analysis and evaluation.

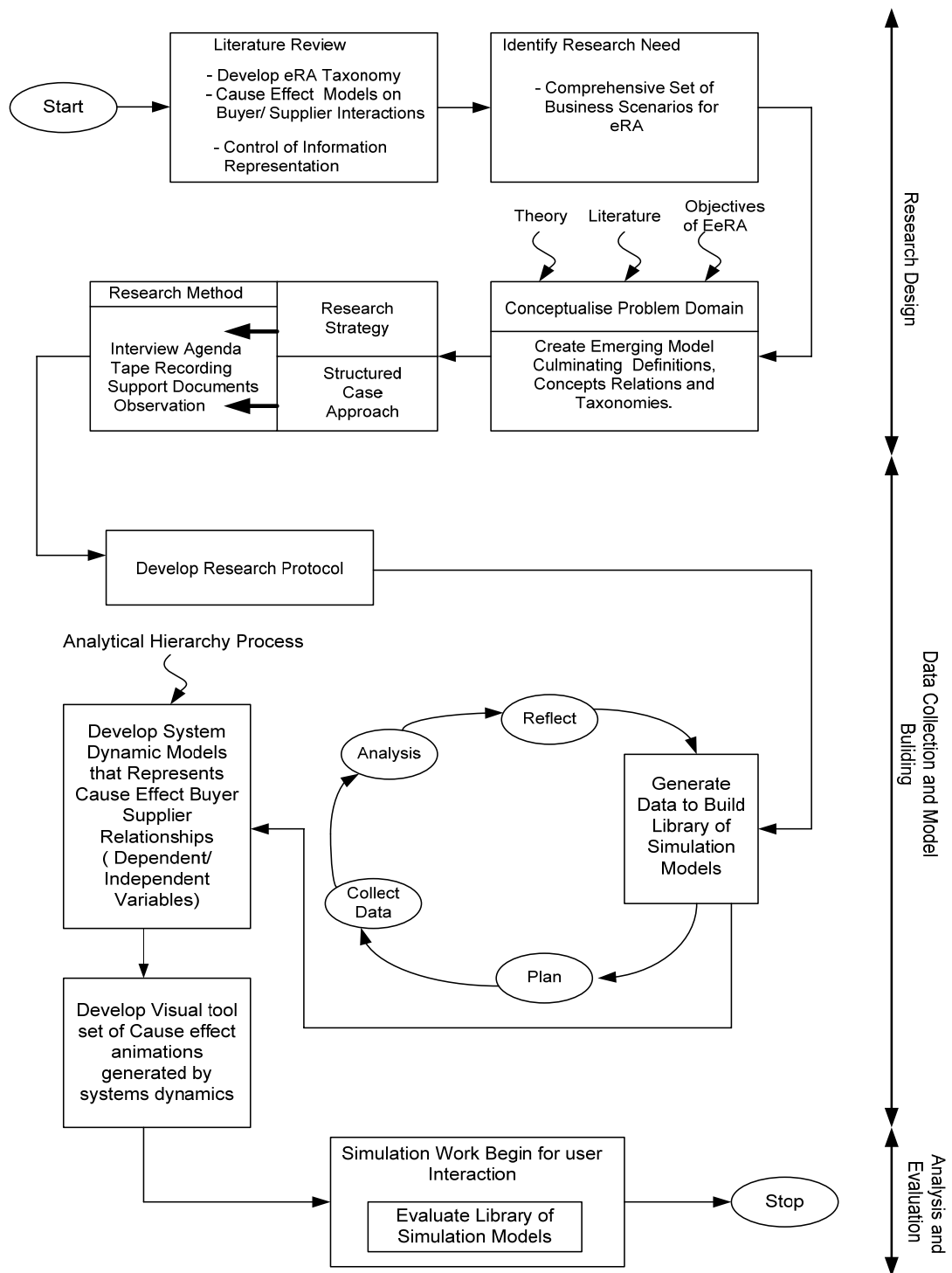


Figure 1: Research Methodology

## 6 COMMUNITY BENEFIT

The immediate beneficiary of the eRA project will be local government. At present, their divisions are exposed to significant public and political pressures as the provision of ICT functions permeate services. Although the 100% accessibility target for 2005 appears an end point, from other perspectives it is modest. Other central and political objectives will drive further changes within the local government sector. The evaluation tools from eRA will assess and identify good practice to inform and improve the change process in the future.

## 7 CONCLUSION

The eGISE network research described in this paper proposes a detailed, achievable and valid approach to evaluating the complex issues associated with eRAs. Additional authoritative research reports inherent adverse consequences through the electronic transactions involved. The EeRA investigation will analysis these situations, in the context of local government, and propose a set of fundamental business scenarios to enable more effective decision making within the eProcurement process.

## 8 ACKNOWLEDGEMENTS

The collaboration and planning to develop this project proposal was undertaken within the Network for eGovernment Integration and Systems Evaluation (eGISE). This is a research network funded by the Engineering and Physical Sciences Research Council in the UK (grant GR/T27020/01)

## 9 REFERENCES

- AMBROSE E. (2005) An analysis of relationship perceptions within buyer-supplier dyads In Proceedings of the 14th IPSERA Conference, pp. 341-354, Archamps, France
- ARROWSMITH S. (2002) Electronic Reverse Auctions under the EC Public Procurement Rules. Public Procurement Research Group, University of Nottingham
- B2B RESEARCH CENTRE B. B. (2003) Analysis of Reverse Online Auction Survey. B2BRC
- BARLING B. (2001) Creating Sustainable Value Through B2B Sourcing. AMR Research
- BEALL S., CARTER C., CARTER P. L., GERMER T. H., JAP S. et al. (2003) The Role of Reverse Auctions in Strategic Sourcing. CAPS Research, <http://www.capsresearch.org/publications/pdfs-protected/beall2003.pdf> [Last Accessed: 2003/12/14]
- BODDY D., CAHILL C., CHARLES M., FRASER-KRAUS H. and MACBETH D. (1998) Success and failure in implementing supply chain partnering: an empirical study. *European Journal of Purchasing and Supply Management* 4, 143-151.
- COUSINS P. D. (2002) A conceptual model for long-term inter-organisational relationships. *European Journal of Purchasing and Supply Management* 8, 71-82.
- DE BOER L., HARINK J. and HEIJBOER G. (2002) A conceptual model for assessing the impact of electronic procurement. *European Journal of Purchasing and Supply Management* 8

- (1), 25-33.
- EMILIANI M. L. (2004) Sourcing in the global aerospace supply chain using online reverse auctions. *Industrial Marketing Management* 33 (1), 65-72.
- EMILIANI M. L. (2006) Executive decision-making traps and B2B online reverse auctions. *Supply Chain Management: An International Journal* 11 (1), 6-9.
- EMILIANI M. L., and STEC D. J. (2004) Aerospace Parts Suppliers' Reaction to Online Reverse Auctions. *Supply Chain Management: An International Journal* 9 (2), 139-153.
- GERSHON P. (2004) Independent Review of Public Sector Efficiency: Releasing Resources to the Front Line. HM Treasury
- GIBBS J. E. (1998) Effective relationships for supply - attributes and definitions. *European Journal of Purchasing and Supply Management* 4, 43-50.
- Irani, Z. and Love, P.E.D. (2001) "The Propagation of Technology Management Taxonomies for Evaluating Investments in Information Systems", *Journal of Management Information Systems* 17 (3): pp 161-177.
- JAP S. (2002) Online reverse auctions: issues, themes and prospects for the future. *Journal of the Academy of Marketing Science* 30 (4), 506-525.
- JAP S. (2003) An exploratory study of the introduction of online reverse auctions. *Journal of Marketing* 67 (3), 96-107.
- JAP S. D., and GANESAN S. (2000) Control mechanisms and the relationship life cycle: Implications for safeguarding specific investments and developing commitment. *Journal of Marketing Research* 37 (2), 227-245.
- KERN T., and WILLCOCKS L. P. (2002) Exploring relationships in information technology outsourcing: the interaction approach. *European Journal of Information Systems* 11 (1), 3-19.
- LAMMING R. C., COUSINS P. D. and NOTMAN D. M. (1996) Beyond vendor assessment - relationship assessment programmes. *European Journal of Purchasing and Supply Management* 2 (4), 173-181.
- LAPIEDRA R., SMITHSON S., ALEGRE J. and CHIVA R. (2004) Role of information systems in the business network formation process: An empirical analysis of the automotive sector. *The Journal of Enterprise Information Management* 17 (3), 219-228.
- MOHR J., and SPEKMAN R. E. (1994) Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques. *Strategic Management Journal* 15, 135-152.
- OFFICE OF THE DEPUTY MINISTER (ODPM) (2003) One Year On: The National Strategy for e-Government. [http://www.localgov.gov.uk/Nimoi/sites/ODMP/resources/local%20e-gov%201Year%20On%20Doc\\_21.pdf](http://www.localgov.gov.uk/Nimoi/sites/ODMP/resources/local%20e-gov%201Year%20On%20Doc_21.pdf) [Last Accessed: 10/03/2004]
- OLSEN R. F., and ELLRAM L. M. (1997) Buyer-supplier relationships: alternative research approaches. *European Journal of Purchasing and Supply Management* 3 (4), 221-231.
- O'TOOLE T., and DONALDSON B. (2002) Relationship performance dimensions of buyer-



supplier exchanges. *European Journal of Purchasing and Supply Management* 8, 197-207.

Remenyi, D., Michael, S. and Terry, W. "*Outcomes and Benefits for Information Systems Investment*", (Year) of Conference Proceedings of the 3rd European Conference for IT Evaluation, Bath University School of Management, Bath University, Bath, pp. 101-120.

SASHI C. M., and O'LEARY B. (2002) The role of Internet auctions in the expansion of B2B markets. *Industrial Marketing Management* 31 (2), 103-110.

SMELTZER L. R., and KARR A. (2003) Electronic reverse auctions: promises, risks and conditions for success. *Industrial Marketing Management* 32 (6), 481-488.

WAGNER S. M., and SCHWAB A. P. (2004) Setting the stage for successful electronic reverse auctions. *Journal of Purchasing and Supply Management* 10 (1), 11-26..

WILLIAMSON O. E. (1975) *Markets and Hierarchies*. Free Press, New York.

WILLIAMSON O. E. (1981) *The Economics of Organizations: The Transaction Cost Approach*. *American Journal of Sociology* 87, 548-577.