A review of research on e-marketplaces 1997–2008

Susan Standing, Craig Standing, Peter E. D Love

Electronic marketplaces are an important research theme on the information systems landscape. In this paper we examine twelve years of research on electronic marketplaces in leading information systems journals. The research articles are classified according to five conceptual high level groupings: electronic markets theory; system perspective with a focus on the technology or functionality with the system; adoption and implementation issues; organisational implications; and broader e-commerce issues. The findings show an increase in electronic marketplace (e-marketplace) research over the twelve years. The analysis of the literature highlights two distinct issues that researchers in the information systems discipline need to address. The first is the lack of research on the fundamental questions on the nature of electronic markets and their efficiency. If information systems research does not address this question then it will not be seen as tackling critical issues by those outside of the discipline. The second is the relative lack of articles on the organisational implications of adopting and managing electronic marketplaces. These include, the organisational benefits, costs and risks of trading through e-marketplaces and strategies and methodologies for managing organisational participation. Both issues can be addressed by increasing the number of macro studies examining efficiencies in electronic markets.

1. Introduction

Considerable research has been conducted on electronic marketplaces over the past twelve years. This topic has been a prominent feature of the information systems research landscape over this period reflecting the rapid growth and later consolidation in electronic marketplace (e-marketplace) numbers. Today, e-marketplaces have a significant role to play in business and continue to be a vibrant research topic. From a research perspective, electronic marketplaces are examples of mechanisms which instantiate the concepts related to economic market theory [35,71] and relational theory in terms of arm’s length relationships [64]. These theories and the actual implementations of e-marketplaces are in contrast to the supply chain hierarchies and embedded relationships that have been the focus of much IS research for many years. Therefore, from a theoretical perspective the study of e-marketplaces is significant because it presents an alternative line of enquiry related to efficiencies created through information technology. Given that just over a decade of e-marketplace research has been conducted, we argue that it is timely to take stock of the wealth of research on e-marketplaces and analyse the need for future research within this field.

In its simplest form an e-marketplace (sometimes referred to as exchange, auction and catalogue aggregator) can be defined as an inter-organisational information system that allows the participating buyers and sellers in some market to exchange information about prices and product offerings [7]. An e-marketplace should enable potential trading partners to be identified and a transaction executed [17]. The study of e-marketplaces is also important from a practical perspective. E-marketplaces have made a major impact on the business world both from a firm and consumer perspective. Their significance has not diminished since the dot.com crash and the subsequent consolidation of many minor e-marketplaces between 2001 and 2003. Those e-marketplaces that remain offer a more viable and sustainable business model for organisations to consider [32]. The distinction between business-to-business (B2B) e-marketplaces and business-to-consumer (B2C) or consumer-to-consumer e-marketplaces is blurring as increasing numbers of firms procure and sell via e-marketplaces such as eBay.

There are many successful B2B e-marketplaces which are still growing in transactions, such as, ChemConnect, cc-hubwoo and Quadrem [27]. ChemConnect, for example, has established itself as a leading independent and neutral 3rd party commodity exchange, auctions provider, bulletin-board, back-end fulfilment service and market information source for chemicals, feed stocks, polymers, fuel oil, and other items. Its membership includes more than 9000 companies from over 150 countries worldwide. cc-hubwoo is the leading global provider for source-to-pay electronic solutions and supplier network management. The company manages the largest B2B e-procurement community in the world with more than 60 buying corporations and over 12,000 connected suppliers in 44
countries worldwide. cc-hubwoo’s trading hub processes 2 million purchase orders representing €5 billion in customer spend value annually. Quadrem is a Global e-marketplace that connects more than 47,000 suppliers and 700 buyers; handles more than US$13 billion in order throughput annually; and grows transactions at a cumulative rate of 21% per month. Currently Quadrem has 47,000 suppliers connected to nearly 700 purchasing locations (www.quadrem.com).

The purpose of this paper is to analyse research articles on e-marketplaces from 1997 to 2008 (12 years) to identify and classify the major areas of research on this topic and highlight the areas of research concentration and areas of research paucity. We analyse the articles to determine the major research questions that need to be addressed. From this we identify a research agenda on e-marketplaces and its implications for the information systems discipline.

2. Research methodology

Research reviews of a specific paradigm are an established form of enquiry within the information systems discipline [58]. Such reviews enable the consolidation of knowledge to take place, in other words, it enables researchers to take stock of what has been accomplished and the trends and patterns in a research area to be highlighted [4,9,68]. These contributions provide researchers with a platform and signposts to conduct future research given that previous research has been conceptually mapped.

The aim of this research is toconceptually classify e-marketplace research conducted over recent years. In doing this, it is intended to identify areas of research concentration and research paucity. A longitudinal perspective is taken to the review in order to identify patterns in relation to research themes, the emergence of new themes, and trends in publication quantity.

The research approach for this study consists of a meta-analysis of the research literature. Articles for analysis were gathered from leading information system journals for the 12 year period 1997–2008. This time frame covers the development of e-marketplace research from its early stages to the present time and is extensive enough to identify the emergence of literature on a range of research themes within the e-marketplace domain. The longitudinal nature of the review enables trends, patterns and themes to be identified and any gaps in the literature to become apparent. The journals selected for inclusion in the analysis were considered on their ranking within the discipline (www.isworld.org/csaunders/rankings.htm) and their impact factors (see Table 1 for list of journals). The number of journals selected was limited to 16 containing e-marketplace literature to maintain the level of quality. Leading research journals were chosen to represent the foremost research in the area and the most rigorous, in terms of academic work having undergone an intensive review process. Journals which are more computer science focused, narrow in focus (niche), or management focused with traditionally few information systems articles were excluded from the list. One management journal, Management Science, was included as it is present in many information systems journal rankings.

The protocol for the selection of the articles and their content analysis are shown in Fig. 1. The inclusion of an article into the analysis was dependent upon the article focusing primarily on some aspect of an e-marketplace. Those articles that concentrated solely on e-commerce were not included. E-commerce is a broader term and can be applied to any form of transaction taking place between a buyer and seller (or potential participants) but does not necessarily involve an e-marketplace. However, articles that focused on e-commerce but included a substantial portion of content on e-marketplaces were included.

The identification of articles within the journal list involved keyword searches and an exhaustive search on contents pages of the journals. Articles that appeared to fit into the e-marketplace category were verified by firstly reading the abstract and then the entire article to extract the main findings and emphasis of the article. Some of the articles that were initially identified via the title or keywords were discarded in this process if either the abstract or the article itself did not primarily focus on e-marketplaces. This process identified 196 articles for the content analysis.

The article analysis method involved a grounded approach that examined the main conceptual emphasis of each article and its stated aims. The purpose of the grounded approach was to develop a conceptual classification from the literature rather than impose a classification framework on to it. Independently, the two researchers developed their classifications from the literature. The content of each article was analysed by examining the title, abstract, keywords, stated aims of the article and a conceptual review of its full content. The two researchers then brought their independent classifications together and through a matching process and the resolution of inconsistencies reduced these to one classification framework.

Once the classification categories were completed, one of the original researchers and a third researcher, not involved in developing the classification, allocated all of the articles to the framework. Again, these two researchers brought their classifications together and resolved inconsistencies, referring to articles again where necessary. The Cohen’s Kappa statistic was used to analyse the correspondence between the researchers allocation of articles to the categories in the classification. There was a high degree of reliability between the researchers (0.93).

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<td>MIS Quarterly</td>
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<td>The Journal of Strategic Information Systems</td>
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This was well above the 0.667 level suggested for a minimum strength of agreement and above the recommended level of 0.80 [44].

Management science has published the largest number of articles on electronic marketplaces over the twelve years (Fig. 2). The second placed journal is Decision Support Systems followed by the International Journal of Electronic Commerce, the leading electronic commerce journal. The other articles are spread across the remaining journals highlighting that there are many facets of electronic commerce.
The benefits of hierarchy versus market mechanisms for conducting business activity have been a significant research issue within economics [20,71] and within the information systems paradigm [49]. The development of IT has been viewed as a primary factor in the reduction of transaction costs and one which allows for a greater number of suppliers in electronic markets [49]. Transaction costs are the costs associated with finding someone with whom to do business, reaching an agreement about the price and other aspects of the exchange, and ensuring that the terms of the agreement are fulfilled [71]. Electronic markets have the potential to streamline and manage these activities and reduce the transaction costs associated with conducting business compared with hierarchies where a company has to manage its suppliers and procurement processes [49]. However, it has been acknowledged that market efficiencies may be related to certain types of non-recurrent transactions [72].

Relational theory examines the role of structural embeddedness which proposes that social ties, the associated networks and relationships formed are important in market transactions and price is not of paramount importance: “trust, fine grained information sharing and joint problem solving” are constructs of structural embeddedness [64] and have an influence on market transactions. The literature that focuses on electronic markets theory can be further classified into the following groups:

### 3.1. General electronic markets theory

These articles examine the characteristics of electronic markets and how and where economic market theories apply in the electronic paradigm. Through the period of literature analysis there has been a shift from a simplistic view that the advantages of economic market theory would be attached to electronic marketplaces [8] to recognition that there are many factors that increase the complexity of electronic markets. This supports the view that a pure form of efficient markets is a concept that is unlikely to occur in practice [34]. As a result more recent research has focused on hybrid market structures and has highlighted the need for further research on how the electronic medium impacts on markets [32].

#### 3.1.1. Efficiency in markets

Efficiency in electronic marketplaces takes many forms. Significant work has been conducted on the theoretical aspects of matching the buyer and seller through various algorithms to select, classify and rank matches. Another major focus is related to efficiencies related to transaction costs. Although market environments are thought to reduce transaction costs, new transaction costs are incurred through the use of e-marketplaces because they engender a more complex environment where there are interdependent transaction risk factors, such as environmental uncertainty, information asymmetry and asset specificity [21]. Lee and Clark [46] found most risks and uncertainties are associated with social and economic barriers rather than with IT.

#### 3.1.2. Search costs

The primary function of e-marketplaces is in reducing buyer search costs. Reduced search costs can have a significant impact on market equilibria that may result in lower prices and increased competition amongst suppliers. However, it is also argued that
suppliers can monitor each other’s prices more easily and so maintain or increase prices [14].

3.1.5. Product

Only one article in the review has focused on product cannibalization within e-marketplaces. Ghose, Smith and Telang [31] empirically analyse the degree to which used products cannibalize new-product sales for books at Amazon. They found that used book sales cannibalization of new book sales is quite low at 16%, that is, 84% of used book sales would not have resulted in the sale of a new book.

3.1.6. Structure

A number of articles examine how various features of electronic markets impact on market structures. These features include information transparency [35] product design strategies [11] and how e-market principles can change the structure of government services [69].

3.1.7. Operational performance

Three articles examine operational market performance of e-marketplaces within the supply chain Singh, Salam and Iyer [60] argue for integration of knowledge and intelligence across the supply chain whilst Lee and Whang [47] examine the impact of on-line secondary markets on the operational performance of manufacturers and resellers. Muylle and Basu [52] examine the operational processes that can be supported by electronic marketplace intermediaries and suggest that those intermediaries that identify a clear role and that choose processes that are consistent with that role are likely to improve their business performance.

Future research still needs conducting on the fundamental issues related to markets and hierarchies as the work to date has raised as many questions as it has solved. These include questions on efficiencies related to e-markets and their impact on prices.

3.1.8. Key research questions

• How does economic markets theory apply in the electronic marketplace arena?
• Do electronic markets result in lower prices?
• How do search costs influence prices in e-marketplaces?
• Does a lack of transparency in the electronic marketplace impact on efficiency?
• How do electronic marketplaces impact on operational performance?
• How does the trading of heterogeneous products impact on the electronic marketplace?
• What are the transaction costs associated with e-marketplaces?

3.2. Adoption and implementation of e-marketplaces

Connection to a B2B e-marketplace may involve a significant investment in hardware, software and employee training [24] and this can impose significant switching costs for participants [3]. Related to the adoption are the challenges of assessing risk associated with the selection of an e-marketplace and possible implementation problems with suppliers. In an analysis of the adoption of an e-marketplace in the Australian beef industry it was found that social and political factors also played a significant role in determining levels of adoption [26]. In particular, Driedonks et al. [26] found loss of social capital, the nature of industry supply chain communication channels, and not recognising power brokers in the supply chain all had an impact on adoption and the success of the e-marketplace.

3.2.1. Adoption approaches

The stages of adoption and related implementation challenges are a fruitful topic of research as many companies find they have little or no experience to draw upon in selecting an e-marketplace, and in defining the stages and phases of implementation [12,30,55]. Dewan et al. [25] examine early adoption benefits such as increased profit and market share that result from the reduction in the sellers’ costs associated with collecting buyer preference information and managing multiple prices. Those firms that customize products can gain a temporary advantage through e-marketplaces using discriminatory pricing to increase market share and also increased prices. However, the benefits of customization disappear when competing sellers adopt the same method as it tends to lead to over-customizing to the detriment of profits.
3.2.2. Adoption in the supply chain

A range of articles have examined adoption in the supply chain from the perspective of cost reduction [18] and dynamic pricing related to the demand for goods [40]. Kalvenes and Basu [42] investigate information privacy in e-marketplaces in order to attract competing firms that may be wary about their buying information being used by the e-marketplace owners. Their approach is one which shifts control over trader privacy from the marketplace operator to the individual trader so that the owner of the marketplace cannot exploit transaction information for strategic purposes.

### Table 3

Articles classified according to categories.

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<th>Category</th>
<th>Sub category 1</th>
<th>Sub category 2</th>
<th>Author(s) and year</th>
<th>No of articles</th>
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<td>Electronic commerce with significant e-marketplace discussion</td>
<td>General electronic markets</td>
<td>Efficiency</td>
<td>Carillo &amp; Beaudry, 2006; Chu et al., 2007; Marchewka &amp; Towell, 2000; Martinsson, 2002; Ngai &amp; Wat, 2002; Standing &amp; Lin, 2007; Storey et al., 2000; Straub &amp; Watson, 2001; Wareham et al., 2005; Xiong &amp; Benbasat, 2007.</td>
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<td>Electronic Markets</td>
<td>Pricing</td>
<td>Di Noia et al., 2004; Lee &amp; Clark, 1996; Lee, 1998; Cordella, 2006.</td>
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<td></td>
<td>Search costs</td>
<td>Bakos 1997; Campbell et al., 2005.</td>
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<td></td>
<td>Product Structure</td>
<td>Ghose et al., 2006.</td>
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<td>Operational performance</td>
<td>Bhargava &amp; Choudhary, 2004; Grover, Ramanilal &amp; Segars, 1999; Lindemann &amp; Schmid, 1998; Schlueter-Langdon &amp; Shaw, 2002; Steyaert, 2004; West, 1997; Yoo et al., 2007.</td>
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<td>System</td>
<td>General systems perspective</td>
<td>Lee &amp; Whang, 2002; Myuller &amp; Basu, 2008; Singh et al., 2005.</td>
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<td>Auction</td>
<td>Albrecht et al., 2005; Anandalingam et al., 2005; Choudhury et al., 1998; Colucci, et al., 2008; Viswanathan 2005.</td>
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<td>General</td>
<td>Atkins, 1998; Bapna et al., 2001; Fasli &amp; Michalakopoulos, 2008; Hinz &amp; Spann, 2008; Kambil &amp; van Heek, 1998; Katok &amp; Roth, 2004; Kleindorfer &amp; Wu, 2003; Pinker et al., 2003.</td>
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<td>Auction support systems</td>
<td>Adomavicius &amp; Gupta, 2005; Avenali &amp; Bassanni, 2007; Bolton et al., 2004; Day &amp; Raghavan, 1997.</td>
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<td>Abbasi et al., 2008; Ba &amp; Pavlou, 2002; Cazier et al., 2006; Charki &amp; Josserand, 2008; Clemons, 2002.</td>
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<td>Procurement and supply chain</td>
<td>Amaldoss &amp; Jain, 2008; Angst et al., 2008; Arora et al., 2007; Bapna et al., 2003(a); Bapna et al., 2003(b); Bapna et al., 2004; Chen, 2007; Day &amp; Raghavan, 1997; Deltas &amp; Engelbrecht-Wiggins, 2005; Ding et al., 2005; Easley &amp; Tenorio, 2004; Edelman &amp; Ostrovsky, 2007; Elmaghraby, 2005; Goyal et al., 2007; Gupta &amp; Abbas, 2008; Ha et al., 2007; Hidvegi et al., 2007; Huh &amp; Janakiramam, 2008; Jones et al., 2006; Kelly &amp; Steinberg, 2005; Kwon et al., 2005; Minner, 2007; Sandholm et al., 2005; Simonsohn &amp; Ariely, 2008; Singh &amp; Sen, 2008; Sniz &amp; Hint, 2003; Standifird et al., 2004; Varian, 2006; Zeithammer, 2007.</td>
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<td>Trading mechanisms</td>
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<td>Cheng et al., 2006; Du et al., 2005; Fan et al., 1999; Granados et al., 2006; Joh &amp; Lee, 2003; Kang &amp; Han, 2003; Lau, Wong, Li &amp; Ma, 2008; Lau, Li Song, &amp; Kwok, 2008; Lee et al., 2006; Levi et al., 2003; Mithas et al., 2008; Subirana &amp; Carvajal, 2000; Xia et al., 2008; Zhao et al., 2006.</td>
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<td>Adoption in procurement and the supply chain</td>
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<td>Barriers/motivations</td>
<td>Gallaugher 2000; Greg &amp; Walczak 2008; Hackney et al., 2004; Hempel &amp; Kwon, 2001; Premkumar, 2003; Ravichandran et al., 2007.</td>
<td>5</td>
<td></td>
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<td></td>
<td>General organisational issues</td>
<td>Chua et al., 2007; Datta &amp; Chaterjee, 2008; Formani et al., 2008; Kim &amp; Ahn, 2007; Pavlou, 2002; Ratnasamy, 2005; Son et al., 2006; Verhagen et al., 2006.</td>
<td>8</td>
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<td></td>
<td>Trust and security</td>
<td>Grover et al., 2002; Montazeri et al., 2008; Volkoff et al, 1999.</td>
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<td></td>
<td>Relationships and networks</td>
<td>Hackney et al., 2007; Phan, 2003; Sheng et al., 2005; Soh et al., 2006; Standing et al., 2006; Watson &amp; McKeown, 1999; Son &amp; Benbasat, 2007; Yoo et al., 2003.</td>
<td>196</td>
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</table>
3.2.3. Barriers and motivation

Barriers to adoption and motivations for adoption are covered in several articles. Howard et al. [39] explore collaboration and interaction by examining four cases of e-hub adoption by vehicle manufacturers and suppliers. A conceptual framework emerges from this examination that helps to assess the real benefits of electronic applications by revealing firm and industry level motivations and barriers. They found that there were often differences between expected benefits and realised benefits when adopting e-hubs due to such factors as problems of systems integration with the e-hubs and increases in supplier–buyer mistrust. Further barriers to benefits realisation include technological compatibility and operational capacity [41].

Further research is still required on the e-marketplace selection process to guide firms in matching their requirements to types of e-marketplaces. Case studies that explain how to adapt procurements processes to fit with this environment are particularly needed.

3.2.4. Key research questions

- What are the adoption costs and risks for organisations?
- What are effective e-marketplace selection methodologies?
- What are the best ways to evaluate the costs, benefits and risks of adoption?
- What factors should be considered in adoption?
- What type and level of training is required?
- What is an effective e-marketplace adoption life-cycle?
- What are the barriers and challenges in adoption?

3.3. System and technology focus

The system perspective of e-marketplaces focuses on the information systems which create the opportunity for the organisation to operate in the e-marketplace. This strand of literature considers the functionality or technological aspects of the information system. Studies of auction mechanisms are included here when their focus is negotiation and the execution of the transaction. The sub-categories within this field include: general system issues, business models from a system perspective, auctions, trading mechanisms and knowledge management exchange. In all of these cases the features of the e-marketplace systems are the focus of the research rather than electronic market theory, adoption or organisational issues.

3.3.1. General system issues

Articles allocated in this category take a broad system perspective of e-marketplaces, often focusing on the technology. Different e-marketplaces have different technological and information standards and e-marketplace standards may not be compatible with EDI and an organisation’s extranet standards. This is identified as a major system issue for the adoption and use of e-marketplace systems [5]. It has also been recognised that e-marketplaces are complex systems due to the dynamic nature of participant learning. So for example, it may be thought that e-markets drive prices lower for buyers but suppliers can respond by increasing prices if they offer more accurate information on goods and their availability [17].

3.3.2. Business models

Business models examine auction structures and sub-systems and their evolution over time. They are included under “system” rather than organisational issues as their focus is the e-marketplace structure rather than the organisational implications of the structures. In a comparison of extranets and e-marketplace structures it is suggested that buyers will choose the latter when the supplier’s advantage derived from access to information is modest compared with the marketplace benefits for the buyer minus the channel costs [23]. The private versus public feature of e-marketplaces has been investigated by Cousins and Robey [22] who found that private metals exchanges were more successful than public metals exchanges because they allowed existing traditional relationships involving trust and privacy to continue when public exchanges did not.

3.3.3. Trading mechanisms

Trading and transaction mechanisms are given significant coverage in the literature. It has been proposed that the negotiation part of an e-marketplace transaction can be automated. The negotiation can be viewed as a search process for a mutually acceptable contract. Research by Cheng, Chan and Lin [16] examine the search component as a multiple-objective decision making problem which is solved through an iterative process of generating offers by fuzzy inference systems.

The fundamental question of what factors affect which transactions are likely to be supportable by B2B exchanges has been examined. Three factors are identified by Levi, Kleindorfer and Wu [48] as being relevant: supplier management, idiosyncratic investments in information systems, and codifiability (i.e. digitalizability) of product and order-fulfilment specifications underlying transactions. They conclude that transaction codifiability (i.e. digitalizability) plays a fundamental role in influencing sustainable contracting and IT investments in e-markets.

3.3.4. Knowledge management systems

Developing e-marketplace systems that share knowledge is a topic that is under represented in the information systems literature. Gosain [33] researched the need to accommodate the tacit, situated and complex nature of knowledge and the challenges associated with its transfer and assimilation within e-marketplaces.

Although considerable research has been conducted on the technical features of e-marketplaces there are some areas that appear under researched. Areas with research potential that require further investigation include mobile access to e-marketplaces, usability of e-marketplace systems and future technical and system developments.

3.3.5. Key research questions

- What are the technical implications of mobile e-marketplaces?
- How do systems design features and constraints impact on usability and usefulness of e-marketplaces?
- How will e-marketplace models and systems evolve? For example, will they offer a greater range of services and information? Will they become knowledge sharing hubs?

3.4. Auction mechanisms

Because of the large number of articles focusing on auction mechanisms it has been included as a separate category. The most common topic of research within electronic marketplaces is the actual auction process itself. These articles focus on the type of auction process, associated algorithms, and the efficiency of auction types. In particular, the functionality of the system is emphasised in terms of pricing of goods, features to provide support to buyer and sellers related to bid strategies, feedback and reputation mechanisms, and trust issues related to auction features. Common research methods in this area are experiments, simulations and analysis of completed auction data.

3.4.1. Auction behaviour and strategies

Auction design is one important aspect of the system which receives attention in the literature. Classifying bidders and how the auction mechanism facilitates bidding have implications for the design and effective use of the mechanism. The development of bidder taxonomies has been linked to the idea of designing bidding agents that are aligned with the buyer’s strategies [10].

3.4.2. Pricing

Pricing within auctions is examined in articles such as Caldentey and Vulcano [13], who analyze a revenue management problem in
which a seller facing a Poisson arrival stream of consumers operating in an online multiunit auction.

3.4.3. Trust
Trust is an issue which can be categorised from a system perspective. The building of trust in the system is crucial to reduce transaction risk. The development of feedback mechanisms are one way in which trust in the seller or organisation can be built [6].

3.4.4. Auction support systems
Adomavicius and Gupta [1] address various computational problems that are relevant from the bidders perspective in combinatorial auctions. They introduce bid evaluation metrics and develop data structures and algorithms to provide information about the state of an auction at any time.

3.4.5. Revenue
Mathematical approaches are used in articles to identify algorithms and expressions that forecast revenue maximisation, under varying conditions [28,67].

3.4.6. Supply chain
Research shows that there are no differences between reverse e-auction adopters and nonadopters on the level of importance placed on the purchasing objectives of cost management and on supplier collaboration. However, there is a significant difference considering organisation size, where reverse e-auction adopters have higher annual sales than nonadopters [38]. Other research has examined e-auction efficiencies in the supply chain such as including transportation costs into the auction as this resulted in savings [15].

Given the range of auction mechanisms and types it would be helpful for future research to provide a comparative analysis of auction types in relation to their impact on the price of goods for buyers and sellers. Much of the research work to date has examined auction types using conceptual approaches and data from completed auctions. There is a need to obtain information from auction participants explaining the reasoning behind their decisions.

3.4.7. Key research questions
- What types of auction mechanism impact on the price of goods?
- Which auction mechanisms do consumers and sellers prefer and why?
- What bid strategies are most effective and why?
- What are the features of an effective bid support system?
- What is rational and irrational behavior in auctions?
- What are effective auction feedback processes?

3.5. Organisational issues
The literature on organisational issues related to e-marketplace participation can be categorised according articles that examine a range of organisational implications, relationships, trust, competitive advantage, strategy and networks. This is a relatively under researched area with key research questions still remaining unanswered.

3.5.1. General organisational issues
E-marketplace participation can have a range of impacts on organisations. Articles that were published before 2000 typically discussed how organisations could leverage e-marketplace participation through such things as brand management and experimentation but also how they could manage the threat of disintermediation [29]. Later articles [37] examine finer grained and more sophisticated issues related to knowledge sharing and innovation through relationships developed via e-marketplaces. More recent articles investigate why the benefits are not always realised through e-marketplaces [57].

3.5.2. Strategy
Participation in e-marketplaces for the purpose of trading goods and services can potentially provide organisations with significant strategic, tactical and operational benefits [63] which in some cases result in competitive advantages [54,59]. Despite the strategic benefits associated with e-marketplace participation, there are problems related to identifying and evaluating the associated benefits, costs and risks. Senior managers are often reluctant to participate in e-marketplaces because of their confusion over the varying benefits (strategic, tactical and operational) that can be obtained and their differing natures (financially tangible, non-financially tangible and intangible) [63]. In addition, many firms that engage in e-marketplace trading still struggle to develop effective participation strategies [61] and fail to identify the benefits and costs associated with participation [63].

3.5.3. Relationships and networks
E-marketplace participation can potentially impact on relationships with suppliers and strategic partners as their use is seen as moving to an arm’s length relational state [36]. Others see e-marketplace participation as a way of developing a network of partnerships [66].

3.5.4. Trust
Institutional based trust has been examined in relation to its impact on assuring online interorganisational exchange relationships [53]. Similarly, Ratnasingam [56] investigates how trust in the e-marketplace technology leads to relationship trust with partners. Trust can also be assessed at the individual consumer level rather than at the organisational level [65].

Benefits from e-marketplace participation are not automatic and because some organisations fail to obtain the anticipated advantages from participation further research is required on successful organisational strategies and approaches. These strategies may differ according to organisational characteristics such as firm size, business sector and organisational culture.

3.5.5. Key research questions
- Identify the factors and strategies that enable organisations to successfully operate in business-to-business electronic marketplaces.
- Determine how the benefits, costs and risks derived from e-marketplace participation are related to the characteristics of the organisation.

3.6. Electronic commerce and e-marketplaces
A number of articles that focus on electronic commerce issues also give significant attention to electronic marketplaces. These articles have been included since although they are not focused solely on electronic marketplaces they make a contribution to our understanding and the related theory. In particular, the development of the Internet and electronic commerce has led to new business models, effective methods to interact with consumers and opportunities to reduce costs. At the same time, the increased competition resulting from the opening up of markets has created challenges for some organisations. Within this rapidly evolving business landscape electronic marketplaces have become an established and accepted sub-set of electronic commerce [68]. This is due to their theoretical and practical significance to both consumers and organisations. Such is the importance of e-marketplaces it would be difficult to provide an in-depth analysis of electronic commerce without explaining the nature of e-marketplaces and their role in business [50]. Uncovering the benefits, costs and risks associated with alternative electronic commerce approaches including e-marketplace participation has become a significant research theme [62].
Future research can investigate the comparative benefits, costs and risks associated with various electronic commerce approaches including those that are founded on strong ties with consumers and those are founded on weaker ties and arms length relationships that are typical with e-marketplaces. Research on the design of web based systems can examine effective design for e-marketplace mechanisms and auctions and the extent to which these are similar to other electronic commerce models [19].

3.6.1. Key research questions

- What are the benefits, costs and risks associated with alternative e-commerce business models?
- What are the effective e-marketplace design principles compared with other electronic commerce models?

3.7. Research methods

A feature of our study is the analysis and classification of research methods used (Table 4). The framework used to classify the research methods was taken from Wareham, Zheng and Straub [68] as it was used in their review of e-commerce literature. Their classification of methods is explained in Table 4. There is a large proportion of conceptual articles, many of which were published in the CACM. This highlights that researchers were attempting to understand the nature of electronic marketplaces and their impact. Also, a number of articles are included under this category because they developed mathematical models and formulas to define efficient auction mechanisms. Data analysis articles rank highly because many research projects gathered data from auction systems such as eBay. Case study articles are also prevalent as individual e-marketplaces became the focus. There are few survey articles because, even at the height of their numbers, there were relatively few e-marketplaces to gather data from in any one country. A number of articles developed auction style systems and used these in experiments or evaluated them in other ways. Developmental articles are numerous because there is a focus in journals such as Management Science and Decision Support Systems on efficient auction mechanisms.

4. Discussion

Twelve years of electronic marketplace research have passed and overall the work has had a major impact on the discipline. Early work by Malone et al. [49] discussed the benefits and potential of electronic markets, stating their superiority over hierarchies in terms of transaction costs. It also predicted the rise of electronic marketplaces. Implementations of e-marketplaces grew rapidly from the mid to late nineties and many struggled for viability from 2000 to 2002. However, after a period of consolidation many viable e-marketplaces increased in profitability and offer a competitive option for firms procuring goods and services and for consumers making purchases.

The classification of e-marketplace literature presented in this article has proposed four key conceptual areas plus articles that have focused on e-commerce with a significant consideration of e-marketplaces (Fig. 5). All five areas are important for electronic markets theory to develop. Figure four highlights the main linkages between these five areas. Moving from left to right in the diagram the work conducted to date becomes more applied and based upon empirical case studies.

Although there have been a considerable number of articles published in leading journals on e-marketplaces there are still many unanswered questions and areas that lack clarity. Many articles have focused on auction mechanisms in relation to their efficiency and effectiveness. In comparison, relatively few articles have investigated the organisation implications of e-marketplace participation and the issues involved in adoption and implementation. In contrast with Wareham et al’s [68] review of electronic commerce research where they found a larger percentage of articles examined strategic and business issues our study has found that relatively few researchers examined the strategic implications and business value aspects of e-marketplace trading. As the adoption of e-marketplace trading is a major organisational decision with many associated risks such as the alienation of the local supplier base and potentially unfilled or poorly filled orders, there is a need for more research on the organisational and business implications. In other words, there should be less focus on the e-marketplace and more emphasis on the process of organising and managing e-marketplace participation [51].

In addition, the fundamental questions related to the debate over the relative merits of electronic markets versus electronic hierarchies still need further research. Electronic markets according to economics theory should have reduced transaction costs and, if not produce a frictionless market, they should reduce the costs associated with conducting business compared with hierarchies. However, it has become apparent from the research conducted to date that the market versus hierarchy issue is much more complex when taken from an abstract theory and placed within an organisational setting [32]. The efficient market hypothesis (EMH) [70] supports the superiority of markets over hierarchies but this doesn’t take into account contextual factors. These may include the nature of the product and whether it needs to be made to exacting quality standards that can only be achieved through developing a lasting relationship with a supplier. Nor does it consider the social and political context of the organisation where the perspectives of constituents need to be considered. Therefore questions related to efficiency in electronic markets, the reduction of transaction costs, switching costs, efficient pricing of goods and causes of friction in markets still require further research.

The above two areas (organisational and electronic markets theory) are examples of macro level studies. In the on-going debate on the significance of information systems research themes, Agarwal and Lucas [2] argue for more macro level research studies to be conducted so that micro level studies do not dominate the research landscape. They classify research that has a narrow focus as micro whilst macro level research investigates transformational aspects of IT. This supports our findings and view that a significant amount of e-marketplace research should address the impact of e-marketplaces rather than the e-marketplace itself. In addition, macro level studies can assess the impact of technology on industry sectors and the economy by addressing fundamental theoretical questions such as the merits of markets over hierarchies. Studies investigating fundamental theoretical issues are more likely to make a greater contribution to the discipline in terms of extending, refuting, or enhancing theory [2]. This is important since the research community is just as important a stakeholder as the practitioner. If a micro focus does dominate e-marketplace research then it may be in danger of being considered less relevant with many critical questions remaining unanswered.

<table>
<thead>
<tr>
<th>Method</th>
<th>Explanation</th>
<th>Percentage</th>
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<tr>
<td>Conceptual</td>
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<tr>
<td>Review</td>
<td>mathematical models, analysis based on</td>
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<td>Data analysis</td>
<td>Document analysis, content analysis, secondary</td>
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<td>Survey</td>
<td>Online or mail surveys.</td>
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<tr>
<td>Experiment</td>
<td>Lab experiment, field experiment, free simulation.</td>
<td>9</td>
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<tr>
<td>Case study</td>
<td>Cases based on interviews, observations and</td>
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<tr>
<td>Developmental</td>
<td>Techniques, methods, frameworks, instruments to</td>
<td>19</td>
</tr>
<tr>
<td>Other</td>
<td>Ethnography, action research, other</td>
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Table 4

Research methods used (classification based on Wareham et al. 2005).
5. Limitations

This review of electronic marketplace research has been restricted to leading information systems journals. This means that it may not be representative of all information systems journals. Also we have only included one journal from outside of the IS field (Management Science). Electronic marketplace research is a multi-disciplinary topic and there are valuable articles in related disciplines such as marketing and management but the focus of this paper was primarily e-marketplace research within information system journals.

6. Conclusions

Overall, twelve years of research on electronic marketplaces have produced many valuable insights into this new paradigm. There have been many articles on various aspects of the technology and auction systems. However, it also highlights two distinct issues that reflect less positively on the discipline. The first is the lack of research on the fundamental questions on the nature of electronic markets and their efficiency. The second is the relative lack of articles on the organisational implications of adopting and managing electronic marketplaces. These include, the organisational benefits, costs and risks of trading through e-marketplaces and strategies and methodologies for managing organisational participation. Both of these areas require more macro level studies that address both organisational issues and economic markets theory.

Acknowledgement

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References
