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## Electronic Purchasing Consortia: a Future Procurement Direction

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Chapter

## Electronic Purchasing Consortia: A Future Procurement Direction?

*Bernd Huber, Edward Sweeney, Austin Smyth*

*SUMMARY. In literature, there has been little empirical research investigation on purchasing consortium issues focusing on a detailed analysis of information and communication technology (ICT) based procurement strategies. Electronic purchasing consortia (EPC) enable purchasing organisations, to varying degrees, to electronically conduct tasks that are necessary for the management of demand aggregation of two or more legal entities, provide efficient ICT-based communication infrastructures and rely more on electronic communication than face-to-face contact. Therefore, there is a need to relate the term EPC to academic literature and thus empower clearer analysis, which is addressed at academics and purchasing professionals alike. Based on the empirical evidence of case studies and a survey among e-Marketplaces / procurement service providers (PSPs) in the automotive and electronics industry sectors, an overall statement is proposed: Effective participation in electronic purchasing consortia can have the potential to enhance competitive advantage. Implementation therefore requires a clear and detailed understanding of the major process structures and drivers at the e-Marketplace / PSP level of analysis.*

### *1. Introduction*

Both academics and practitioners have become very innovative in developing new strategic procurement concepts (such as early supplier involvement) in order to administer buyer-supplier relationships more effectively (van Weele, 2000). One of the main reasons is the concentration on core competencies at the company level, which led to a significant increase of sourcing activities. In the literature however, there has been little

empirical research investigation on purchasing consortium issues focusing on a detailed analysis of ICT-based procurement strategies.

According to Hendrick (1997), a purchasing consortium is “*a formal or informal arrangement, where two or more organisations, who are separate legal entities, collaborate among themselves, or through a third party, to combine their individual needs for products from suppliers and to gain the increased pricing, quality, and service advantages associated with volume buying*”. Arnold (1996) specifies some constitutional features for co-operation in general: “*Independence of co-operation members is a criteria used by law to distinguish co-operation from merger. That causes tensions between autonomy and dependence. The membership in a co-operation is voluntary; nobody should be forced to participate. The main interest of the co-operation is an ex ante matching of plans or co-ordination of single interest, normally in a company’s function like purchasing etc. The main goal of a co-operation is to reach better economical results for all co-operation partners.*”

Essig (1999) notes that a purchasing consortium may be just one, but an important element of a supply strategy and may be combined with other effective sourcing strategies such as global sourcing, single sourcing, system sourcing, and other strategies. The selection of available sourcing concepts characterises the supply strategy (see Figure 1). Pooled purchasing is a strategic task of purchasing management that should be firmly rooted in the purchasing processes, procedures and policies of a corporation (Essig, 2000). However, academic research in purchasing consortia overall and in particular in EPC is therefore quite limited because purchasing consortia have traditionally not been very well adopted within industry. Conceptual and empirical articles are scarce. Few researchers have analysed purchasing consortia: For example, Essig (2000) examined research in purchasing consortia both in the Anglo-Saxon countries and in Germany, whereas Hendrick (1997) has analysed a blueprint for the formation of purchasing consortia by survey research among the Fortune 500 in the United States.

With the advent of ICT such as the Internet, there may be better entry options for the formation and management of purchasing consortia to enhance their effectiveness and efficiency level. Electronic purchasing consortia (EPC) enable purchasing organisations, to varying degrees, to electronically conduct tasks that are necessary for the management of demand aggregation of two or more legal entities, provide efficient ICT-

based communication infrastructures and rely more on electronic communication than face-to-face contact.

*Figure 1 The Sourcing Toolbox*

<i>Sub-strategy</i>	<i>Sourcing Concepts</i>			
<i>Supplier Sub-Strategy</i>	Sole Sourcing	Single Sourcing	Dual Sourcing	Multiple Sourcing
<i>Object Sub-strategy</i>	Unit Sourcing		Modular Sourcing	
<i>Area Sub-Strategy</i>	Local Sourcing	Domestic Sourcing	Global Sourcing	
<i>Time Sub-Strategy</i>	Stock Sourcing	Demand Tailored Sourcing	Just-in-Time	
<i>Site Sub-Strategy</i>	External Sourcing		Internal Sourcing (Factory within a Factory-Approach)	
<i>Subject Sub-Strategy</i>	Individual Sourcing		Consortium Approach	

Source: Essig (2000)

While aforementioned researchers do not discuss ICT in relation to purchasing in any great detail, Quayle (2002) surveyed SMEs to comment on the feasibility and desirability of a purchasing consortium using e-Commerce. There was a mixed reaction to the concept. Some 70% of respondents thought that such a consortium was desirable but 60% of those considered that it might not be feasible. That as one of the reasons why Quayle recommended that research is required to investigate the operational characteristics and constraints of such consortia.

Moreover, Corsten and Zagler (1999) describe various tasks required for EPC management. They report about an action research project on purchasing consortia and Internet technologies. The starting consortium

consisted of seven industry partners, predominantly from the machining industry in the Lake Constance area. The intention was to develop an Internet platform where SMEs can exchange knowledge, pool demand and attract suppliers. However, their study did not include important research issues such as the empirical level of EPC adoption with regard to industry sectors' structures and anti-trust limitations, a categorisation of EPC management structures and scope, revenue models, etc. that are explained and elaborated on in more detail in the following. The lack of studies that focus on ICT-supported purchasing consortia provide room for improvement in both managerial and academic research.

## 2. Theory Background

Pooled sourcing strategies are not a new concept. However, they have been mainly evolving in the public sector, where co-operative purchasing has been practised in non-profit institutions (e.g. universities). Therefore, when exploring the most relevant approaches to pooled sourcing in literature in general, co-operative purchasing models in the public sector are primarily analysed (e.g. Housley, 1983). However, co-operative purchasing is but one of the entire global pooled procurement strategy terms. Due to the concentration on core competencies, the trend of industrial enterprises towards the formation of strategic demand aggregation alliances started mainly in the last two decades and is described as consortium purchasing (Essig, 1999). According to Major (1997), a purchasing consortium is an offshoot of the more traditional buying group, the co-operative. Harland (2002) confirms that it was not until the 1990s that any substantive empirical research of supply across inter-organisational networks was undertaken.

However, the theoretical foundation for EPC is complex, going well beyond the field of purchasing. As stated by Amit and Zott (2001), no single strategic management theory can fully explain the value creation potential of e-Business. They note that rather, an integration of the received theoretical perspectives on value creation and a multi-perspective approach is needed, as “(...) *virtual markets broaden the notion of innovation as they foster new forms of collaboration among firms (rather than merely new products or production processes) and involve new exchange mechanisms*

*and unique transaction methods*". An integration of strategic management theories is required to situate EPC in literature.

The resource-based theory (e.g. Barney, 1991) and the positioning stream (e.g. Porter, 1985) to competitive advantage have not addressed issues where industrial firms have not as such developed critical resources and capabilities but in co-operation with other firms. This theoretical perspective suggests that competitive advantage can also be developed through inter-firm co-operation and links. That is why the theory of strategic networks and alliances (e.g. Gulati, 1998; Jarillo, 1988), which are based on a continuum between market and hierarchy, is very relevant to EPC as a further paradigm to competitive advantage.

According to Essig (1999), a purchasing consortium represents a hybrid institution between market and hierarchy because partners combine their purchasing power but still continue to exist as separate companies. Based on the model of transaction cost and production cost theory, size and volume obviously effect economies of scale and scope. Corsten and Zagler (1999) state that electronic purchasing consortia may exploit synergetic potentials of economies of scale and scope (e.g. Montgomery and Wernerfelt, 1988) without the diseconomies of increased transaction and communication costs (e.g. Williamson, 1975). Symbiosis is the driver and a prerequisite for successful consortia (Essig, 1999). However, the effects are diminishing with increased asset specificity. Synergy achieved from network relationships can provide the foundation why electronic purchasing consortia are formed. Rozemeijer (2000) argues that synergy is all the new value that can be added through the organisation and the structure of interrelationships between independent units.

However, EPC theory requires the integration of virtual structures in strategic alliance networks and virtual organisations (e.g. Bakos and Treacy, 1986; Malone *et al.*, 1987) as well as strategies in dis- or reintermediation (e.g. Wigand and Benjamin, 1996) and in e-Procurement (e.g. Gebauer and Zagler, 2000) to fully explain EPC. Traditionally, the lack of integration and communication infrastructures was regarded as one of the biggest barriers preventing the adoption and success of purchasing consortia. Electronic purchasing consortia, as a network enabler, can potentially offer a more efficient communication infrastructure with lower transaction costs (Corsten and Zagler, 1999). Davenport and Short (1990) confirm that ICT systems are one of the most powerful devices to shrink co-ordination costs in network approaches. Metamediaries such as e-Marketplaces and

procurement service providers can enable firms to adopt effective e-Procurement systems. Replacing expensive EDI solutions governed by only one buyer in a closed system, low entry costs, fast return on investment and protection of existing EDI investment, recent developments in XML-programming, are all reasons for the transformation of the supply chain into a network by Internet technologies (Richmond *et al.*, 1998). According to the US Federal Trade Commission (USFTC, 2000), “*the aggregating power of the Internet can overcome circumstances where otherwise the cost of information gathering outweighs the value of the surplus*”.

Therefore, the success of electronic purchasing consortia may be impelled to a large degree by advances in ICT. However, van Weele (2000) reports that most organisations lack an effective communications and information infrastructure, which may organise, support and facilitate the highly complex and often rapidly changing interfaces among the organisational entities and disciplines involved in purchasing processes. Therefore, the configuration and co-ordination necessary for e-Procurement strategies have of late received an increasing amount of research attention. Nonetheless, Knudsen (2002) points out that there are still some uncertainties as to how the overall performance of purchasing departments can be improved by e-Procurement.

E-Procurement solutions and concepts are very diverse and have many different meanings. de Boer *et al.*, (2002) note in that respect that the potential merit of various e-Procurement concepts, such as electronic catalogue systems and software, electronic auctions, intelligent agent applications, or electronic marketplaces, seems largely undisputed (e.g. Croom, 2001; Smeltzer and Ruzicka, 2000). However, with regard to the wide range of solutions available, many firms still struggle with assessing e-Procurement suitability for their purchasing processes and mainly adopt a ‘wait and see’ approach. Moreover, there is no one best way to organise for purchasing synergy and to improve inter-organisational demand aggregation and purchasing co-ordination practices (Rozemeijer, 2000). A classification and categorisation of EPC structures and drivers is missing in literature.

### *3. Research Methodology*

Based on this background, an overall statement is assessed: Effective participation in electronic purchasing consortia can have the potential to

enhance competitive advantage. Implementation therefore requires a clear and detailed understanding of the major process structures and drivers at the e-Marketplace/ PSP level of analysis. The analysis of the overall statement covers issues such as

- Industry sectors, anti-trust limitations and take-up of electronic purchasing consortia.
- The level of awareness and importance of electronic purchasing consortia and further customised services.
- Management structures, trading mechanisms and scope of EPC.
- Revenue models for electronic purchasing consortia.
- Level of benefits and drawbacks of electronic purchasing consortia.
- Critical factors in creating and managing electronic purchasing consortia.
- Relationship between ROI and the use of electronic purchasing consortia.

Five explorative case studies were conducted to obtain a first understanding of a conceptual framework of EPC structures and process drivers. The selection of cases was made to discover the whole variety of EPC trading mechanisms. 29 focused interviews have been conducted, the respondents of which were predominantly purchasing and IT managers. Further information has also been collected from secondary sources (e.g. internal reports, press releases). Figure 2 summarises the background of the explorative case studies.

*Figure 2 Case Study Origin*

<b>Case</b>	<b>Background</b>
1	Consortium-led OEM e-Marketplace in automotive industry
2	Supplier-driven e-Marketplace in automotive industry
3	Regional multi-industry purchasing consortium
4	EPC software / procurement service provider in electronics industry
5	E-Marketplace / procurement service provider in MRO industry

However, case studies and other qualitative forms have long been criticised for their limitations in terms of generalisability to a larger population and the lack of sampling controls. Therefore, an online survey



instrument for e-Marketplaces and procurement service providers was additionally implemented and sent to 102 international active e-Marketplaces and procurement service providers in the automotive, electronics and closely related industries. Reasons for the choice of the sectors derive from the background that both industries are pioneers and advanced in supply chain management and e-Procurement. By choosing a multi-method mix the disadvantageous effects of either approach may be minimised, while taking advantage of the creative potential of qualitative techniques as well as the analytics of quantitative techniques. The results of the case studies and the survey are presented in the following.

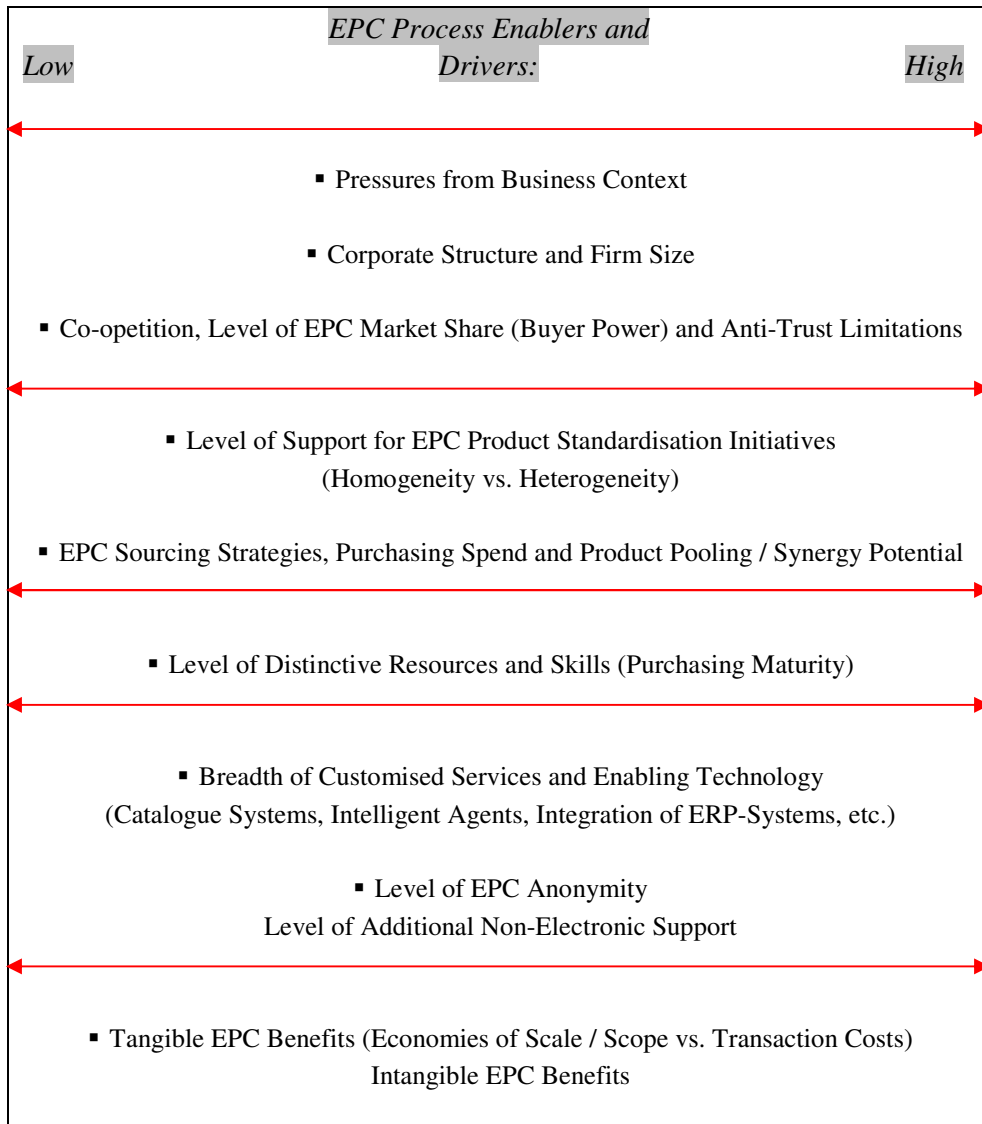
#### *4. Case Study Findings*

Figure 3 shows a first classification and categorisation of EPC structures and drivers derived from the case study findings in order to contrast conditions that help to frame operational measures (McCutcheon and Meredith, 1993). From the case research, it became clear that each EPC has its own characteristics and distinguishing marks governed by e.g. sourcing projects, industry sector, market position and buyer power, corporate strategy or structure. However, a range of EPC structures (e.g. five EPC trading mechanisms) and process drivers / enablers could be identified from the case studies. There is a great variety in EPC approaches to achieve purchasing synergy. Thus, the figure probably cannot provide a complete picture, but a valuable starting point for further research on EPC.

While third-party intermediaries by definition per se do not cleanly fall into the EPC continuum between markets and hierarchy, the case study research found two categories of intermediaries that support EPC: The laissez-faire model, where the e-Marketplace / PSP typically acts as a lead source for purchasing organisations and suppliers and provides e.g. product information, customisation, specifications or exchange mechanisms in order to facilitate demand aggregation. In this way, the laissez-faire e-Marketplace / PSP itself plays a passive role in negotiating on behalf of either seller or buyer, but provides the EPC infrastructure. The second mediated EPC operating model is one where the e-Marketplace / PSP acts as an active intermediary, which takes part in demand aggregation and negotiation strategies on behalf of buyers or suppliers.

Figure 3 Classification of Electronic Purchasing Consortia

<i>EPC Structures:</i>				
Classification of EPC Co-operation: (Informal ↔ Formal ↔ Outsourced)				
▪ Laissez-faire Model		▪ Mediated Operating Level		
Type of EPC Market Mechanisms and Negotiation Process:				
EPC with e- RFQ or Reverse Auction	Pre-Production Buy-Cycle	Time-Limited Buy-Cycle	Buy-Cycle with Rebate Scheme	Pre-Negotiated Infomediation
EPC Industry Focus:				
▪ Industry-wide (Vertical) Focus		▪ Cross-Industry (Horizontal) Focus		▪ Geographical Area
EPC Network Focus:				
▪ Buy-side Focus ▪ Stable EPC Network		▪ Neutral		▪ Sell-side Focus ▪ Dynamic EPC Network
EPC Sourcing Approach:				
▪ Spot Sourcing			▪ Systematic Sourcing	
Type and Level of EPC Revenue Fees				



Another classification involves the type of EPC market mechanism and negotiation processes. It was found from the case studies that several EPC trading and aggregation models exist that can range from:

- EPC with electronic requests for quotation (e-RFQ) or reverse auctions.
- Pre-production demand aggregation price curves, i.e. multiple buyers can electronically aggregate their orders around a supplier's pre-set and pre-production shipping date at the expense of additional inventory costs for purchasing organisations.
- Time limited buy-cycles, i.e. prices continually amend in pre-set increments and time-frames as new group orders are electronically placed.
- Buy-cycles with rebate schemes, i.e. an additional rebate is granted once the total number of purchasers has been electronically finalised.
- Pre-negotiated infomediation, i.e. EPC providers pre-negotiate purchasing prices based on aggregated demand and electronically link buyers and suppliers, but do not take ownership of products.

The findings from the case studies suggest that the fit and compatibility of the available EPC trading mechanisms and technology with organisations' existing procurement practices play an important role. Overall, the presented EPC trading mechanisms are subject to a variety of further process enablers and drivers and firms have to decide on structural designs how EPC can be best integrated for particular sourcing projects. For example, the case study findings confirmed Rozemeijer (2000) that these structural designs can have a regional, national or global scope or can also vary between co-operation that is voluntary, informal, and initiated bottom-up, and co-operation that is mandatory, formal and initiated top-down by top management. The structural designs can also include for example EPC revenue fees, which can vary between a mixture of e.g. transaction fees, fixed / monthly fees, initial licence fees or expenses paid on the basis of achieved cost savings.

From the case studies it was also learnt that different EPC sourcing approaches can prevail. Systematic sourcing typically involves long-term buyer-supplier contracts and was strongly integrated into EPC with e-RFQ and reverse auctions as well as pre-production buy-cycles. However, information and communication technologies facilitate the initiation of EPC spot sourcing and co-operation in dynamic alliance networks that can be more short-term based and project-oriented. EPC therefore may range from

long term institutionalised entities to ad-hoc agreements between independent organisations. The case studies illustrated that dynamic EPC predominantly concentrate on commodities with rather low asset specificity and high product pooling potential. While stable networks may typically benefit from the construction of mutual trust, repeated co-operation and standardisation, dynamic EPC networks can temporarily integrate new external partners during any new sourcing project. Dynamic EPC can call on markets from an array of organisations to potentially respond more efficiently and effectively to market sourcing opportunities and potentially operate at lower cost than stable networks, but at the potential expense of standardisation and trust building initiatives.

The level of anonymity between EPC partners is closely linked to the distinction between stable and dynamic EPC. When search costs and the advantages from long-term relationships are rather low, purchasers and sellers may typically interact with virtual anonymity, as is the case in highly liquid commodity markets. While EPC anonymity can potentially eliminate inefficiencies in the markets where product homogeneity prevails, there would be only limited opportunities for true anonymous EPC in the automotive and electronics industry since a large part of the products are rather complex and differentiated. In order to integrate a significant part of purchasing volume into EPC and to aggregate heterogeneous products among EPC members, it could be established from the case studies that active commodity management, product customisation and standardisation initiatives are required. A high level of collaboration between organisations can also require additional semi-automatic or non-electronic support (e.g. moderation services, face-to-face meetings).

Since the EPC partners would have no physical contact, some of the qualities of face-to-face communication may not take effect. For instance, Spar and Bussang (1996) confirm the absence of established rules on the Internet, which according to their view leads to an uncertainty about the possible behaviour of the business partner. Challenges (such as shared understanding about EPC outcomes and how to achieve these outcomes or the integration of procurement skills and knowledge across systems, boundaries and cross-functional teams) are more salient in EPC with a high level of virtuality. The case study findings suggest that integrated EPC workflow processes should be able to support frequent formal and informal interaction between members in order to realise purchasing synergy and aggregate buyer power.

From a buyer power anti-trust point of view, industry-led e-Marketplaces / PSPs are noteworthy because they bring together powerful groups of buyers. EPC that adopt an industry-wide (vertical) focus are typically reviewed in terms of the traditional trade commissions' competition rules. In the case studies, anti-trust limitations did not appear for cross-industry (horizontal) EPC co-operation or for a geographical area. Although the trade commissions provided general guidelines and regulations on the treatment of consortium purchasing by competitors, they have still not ruled exactly on this issue for e-Marketplaces / PSPs. The legal conditions for EPC are still not fully clear and there is still some uncertainty as to how exactly the prohibition on illicit sensitive information exchange can and should operate with regard to EPC. Therefore, it can be concluded that e-Marketplaces / PSPs with industry dominating players will have to tread a fine line between procurement optimisation and restrictive behaviours such as forming an EPC monopsony or oligopsony.

Another observation from the case studies is that pressures from the business context seem (e.g. cost reduction) to drive firms to take advantage of EPC potentials. Pressure to reduce costs was rather high in all cases. EPC may be an initiative to deal with these business pressures and to realise purchasing synergy in terms of tangible (e.g. net savings) or intangible benefits (e.g. know-how transfer, benchmarking of best practice). The multiple case studies highlighted different EPC trading mechanisms, process enablers and drivers, which can be used to enable a better understanding of the diversity of EPC approaches in practice. However, to add further empirical results, the results of the survey among e-Marketplaces / PSPs are presented in the following.

## *5. Survey Results*

The survey instrument was a standardised questionnaire mainly composed of multiple choice questions and numeric questions. Any effects of personal bias were controlled to the degree that extensive pre-testing of the survey instruments with practitioners and academics sought to identify weaknesses in the make-up of questions or indeed identify omissions.

This pre-tested questionnaire was originally electronically sent to 196 international active e-Marketplaces and procurement service providers in the automotive, electronics and closely related industries. Due to a

consolidation phase and decrease in the population of e-Marketplaces / PSPs, 94 of them had terminated their operations and the population was reduced to 102 e-Marketplaces / PSPs. The procedure to achieve a sufficient response rate and to obtain non-respondents' data was an integrative process. First potential respondents were contacted four times during the first response period by e-Mail. Next, non-respondents in the surveys were contacted by phone and were interviewed on the level of current and future EPC implementation. This process could provide the grounding for a non-respondent analysis. 34 e-Marketplaces / PSPs were willing to provide data to these two questions, but could not be motivated during the phone calls for full survey participation. Non-respondents were finally contacted up to four attempts by phone so that the full-survey coverage increased to a final response rate of 42% (i.e. 43 responses). 24 e-Marketplaces / PSPs were not at all interested in the research. This response rate can be considered as very satisfactory in comparison to other survey research.

The non-response analysis from the 34 participants did not reveal any significant differences and indicated that the pattern of responses was reflective of the sample frame. Additionally, surveys were tested for statistically significant differences in the responses of early and late returned surveys. Again, no significant differences were found, suggesting that the sample is representative for the population. The geographic distribution of response shows that most participation came from Europe, followed by the US. All e-Marketplaces and PSPs were operated for profit; non-profit organisations did not participate in the survey.

Electronic purchasing consortia were offered by 19 of the total 43 participating e-Marketplaces and PSPs (44%). EPC are offered less in the automotive industry (39%) than in the electronics industry (65%). E-Marketplaces and PSPs that offer electronic purchasing consortia tend to be buyer-centric. Overall, e-Marketplaces in general provide electronic purchasing consortia only in limited cases. Only 27% of e-Marketplaces offer EPC in comparison to 82% of PSPs. The findings suggest that e-Marketplaces generally still have potential to develop and integrate EPC. Currently, it was found that most e-Marketplaces concentrate on automating purchasing and order replenishment processes, whereas PSPs focus more closely on strategic procurement. PSPs take advantage of semi-automatic or non-electronic communications tools as well that can assist in gaining purchasing managers' trust to participate in electronic purchasing consortia. Few EPC providers among e-Marketplaces offer consulting services to

establish whether or not purchasing organisations would be generally willing to participate in EPC and to institute a certain level of trust between potential consortia members. The findings also suggest that PSPs, after having established an agreement to EPC, strongly support electronic implementation of RFX processes, e.g. reverse auctions. This is one of the reasons why the authors have set up the definition of EPC in such a way that the level of virtualisation may vary from case to case. Other non-electronic communications might be necessary as well.

None of the industry consortia-led exchanges currently offer any electronic purchasing consortia. This appears worth noting because they would already have finished decisive phases of EPC such as finding partners, building up trust among the members and getting agreements in place. This finding confirms the case studies that industry consortia-led exchanges are typically set up by the major industry players and therefore demand aggregation might not be able to proceed due to anti-trust limitations. 60% of electronic purchasing consortia providers have requested legal approval before implementing EPC. The average number of competitors against non-competitors in the consortium is approx. 25%. This finding confirms that anti-trust is a major consideration to electronic purchasing consortia and that is why electronic purchasing consortia to date are mostly built by e-Marketplaces and PSPs for multi-sectoral consortia.

Overall, e-Marketplaces / PSPs specified that there would be an increase of take-up of electronic purchasing consortia from 44% to 61% and an increase in the offering of reverse auctions from 63% to 79% in the future (defined as next five years). Moreover, e-Marketplaces / PSPs indicated a rise in the service provision of the combination EPC and reverse auctions from 28% presently to 56% in future. This future growth clearly stresses the awareness of both electronic purchasing consortia and reverse auctions to e-Marketplaces and PSPs. In particular, e-Marketplaces seem to have realised the potential of EPC and reverse auctions and try to add this functionality in future. E-Marketplaces and PSPs that have implemented electronic purchasing consortia and reverse auctions regard them as an essential part of their functionality and business strategy. However, EPC providers also specified that EPC and reverse auctions are just one element of their overall service provision and support them with more functionality and customised services such as legacy system integration, tracking and tracing, collaborative engineering, among others. The majority of e-Marketplaces and PSPs seem to have realised the potential of more value



adding services and generally plan to add functionality in future in order to avoid building one-off, single-sided functions. Overall, EPC providers to date do not offer more functionality than non-providers.

E-Marketplaces and PSPs cited the lack of firm participation as critical to its service offerings. Other major drawbacks specified for electronic purchasing consortia are potential anti-trust issues and that company secrets are perceived by purchasing managers not to be kept confidential to competitors. Firms that collaborate, even with non-competitors, may fear that firms may be directly or indirectly provided with sensitive competitive information (Hendrick, 1997). A high degree of trust among all participants and a strong management support are considered as vital factors for electronic purchasing consortia.

For suppliers, drawbacks cited mainly include that the increased transparency in EPC can result in lower margins and more pressure from purchasing organisations. That is why strong suppliers, especially of strategic items, may resist participating in EPC. Hendrick (1997) explains that by keeping the members of an EPC as separate customers, they can extract higher margins that could be negotiated by the group. While collaboration with suppliers and other companies is perceived by 95% of all e-Marketplaces and PSPs as it is getting more important in the future, e-Marketplaces / PSPs predominantly offer EPC solutions that focus on a rather transactional, arm's length buyer-supplier relationship. E-Marketplaces and PSPs acknowledged supplier benefits such as a quick access to large pools of buyers with lower sales costs and long-term business volume. Overall, EPC providers estimate the benefits of EPC on a higher scale and the drawbacks on a lower scale than non-providers. Having put EPC in practice, it seems that benefits can outweigh the drawbacks.

Another factor to be taken into consideration is the product pooling potential: E-Marketplaces and PSPs generally estimate that 32% of their products could be pooled. Providers of EPC specify an average present product pooling of about 15% and acknowledge that there is still some potential to increase their average present pooling of products. In terms of revenue models, providers of both electronic purchasing and reverse auctions do not charge solely suppliers at all. 50% of EPC providers charge only buyers; the other half charges both suppliers and buyers. Hendrick (1997) found that purchasing consortia have in most cases no direct fees and each member contributes expense coverage, time and effort about equally. The survey confirmed the case study findings that for EPC, there seems to

some shift to a mixture of revenue models such as the payment of expenses based on a percentage of purchases, fixed monthly / yearly revenues or fees paid as a percentage of cost savings. One explanation for this finding can be that for example the fees paid as a percentage of cost savings can have more immediate benefits and ROI for purchasing organisations. Less financial risk can be involved and outsourcing can take precedence.

In terms of tangible benefits, providers of electronic purchasing consortia specify an average saving in purchasing costs of 12.4% with demand aggregation. With EPC, member companies have to invest an average of 7.0% of purchasing costs for setting-up and managing the electronic purchasing consortium. As a result, an average net saving of 5.4% and a ROI of 77% can be calculated for companies that participate in EPC. For reverse auctions, a higher ROI results: The average savings (in % of purchasing costs) for buyers in reverse auctions were 16.1%. The average buyer investment for reverse auctions (in % of purchasing costs) was 4.6%. The result is a net saving of 11.6% and a ROI of 254%. However, there usually is a cut off point or minimum amount to order to conduct a reverse auction effectively. Providers of reverse auctions specify that there should be an average minimum amount of 51,000 euros of a specific product demand to run a profitable reverse auction. This finding reveals that electronic demand bundling can well be a prerequisite for smaller purchasing organisations to obtain the required purchase volume for a profitable reverse auction. Providers of both EPC and reverse auctions claim to achieve average savings (in % of purchasing costs) of 28.5% by the combination of EPC and reverse auctions. The average investment (in % of purchasing costs) for both EPC and reverse auctions is 11.1%. Consequently, an average net saving of 17.4% and a ROI of 155% results by the combination of both reverse auctions and electronic purchasing consortia. Obviously, this tandem can achieve significant net savings and ROI. There was no statistical evidence that the more customised services are offered by e-Marketplaces / PSPs, the higher the general net savings in purchasing costs achieved. Presently, providers of EPC and reverse auctions seem to be quite satisfied and positive about electronic purchasing consortia and reverse auctions. Figure 4 summarises the key survey findings.

*Figure 4 Key Survey Findings*

- EPC offered by 27% of e-Marketplaces and by 82% of procurement service providers.
- Future EPC adoption among e-Marketplaces / PSPs will increase.
- Anti-trust limitations require legal approval, in particular for consortium-led e-Marketplaces.
- E-Marketplaces / PSPs try to add customised services to avoid building single-sided functions.
- Average economies of scale and scope exceed EPC transaction and communication costs.
- A mixture of funding options for EPC is provided by e-Marketplaces / PSPs.

#### *6. Discussion of Findings*

All in all the results demonstrate that, despite some scepticism and drawbacks, electronic purchasing consortia, it is perceived, will become more important in the future. The overall consensus is positive. New electronic metamediaries such as e-Marketplaces and procurement service providers have the potential to interpose themselves between suppliers and buyers by taking advantage of new types of economies of scale, scope and knowledge, enabled by ICT, in particular the Internet.

However, the analysis of EPC process structures and drivers among e-Marketplaces / PSPs also reveals that major barriers exist to adoption: For example, legal limitations can evolve, which are, according to the trade commissions, amenable to traditional anti-trust analysis. The further EPC extend beyond the 'safe harbour', which under EU guidelines is fixed at 15%, the greater the risk of a negative competitive effect. In the US, if less than 20 percent of a market is affected by an exclusive arrangement, the practice will likely avoid regulatory scrutiny because it falls within the antitrust safety zone. Anti-trust limitations can be one of the reasons why EPC are offered less in the automotive industry (39%) than in the electronics industry (65%).

What differentiates the electronics industry from the automotive is higher volatile demand, more rapid inventory depreciation and a more dynamic character. The electronics industry is not as vertically integrated

and concentrated as the automotive industry, which makes it a better candidate for EPC models. Potential anti-trust limitations are more likely to arise in the oligopsonistic automotive industry. For example, the consortium-led e-Marketplace Covisint specifies on its website: *“First, Covisint will not aggregate the purchases of one OEM with those of another OEM. Second, Covisint will not offer aggregated purchasing services for any automotive-specific parts or materials. Third, Covisint's future aggregated purchases of non-automotive specific parts (such as office supplies, cleaning supplies, etc.) will always be within the applicable competitive law guidelines in the market in which the purchases are made.”*

By forming EPC within Covisint, several OEMs would dominate the automotive purchasing share world-wide. Due to regulatory issues consortia of automotive manufacturers will not be allowed to pool their demand for production parts. Nonetheless, Covisint has taken a very conservative approach: Demand aggregation between OEMs and tier 1 suppliers (for e.g. raw materials) which is common practice in the automotive industry was also not integrated. EPC providers have to establish means by which the risks of collusion or anti-trust can be ameliorated, e.g. by erecting firewalls to prevent access by competitors to certain information, by implementing the use of nondisclosure or confidentiality agreements or by restricting EPC membership when members' purchasing volumes approach 15% of the respective product market. In this respect, the ongoing dialogue between trade commissions, e-Marketplaces / PSPs and purchasing organisations is a prerequisite to fully take advantage of EPC potentials.

E-Marketplaces / PSPs also cited further challenges to EPC such as a not adequate training and education of purchasing managers in EPC, a low degree of information on change management and, rather self-critically, a lack of maturity in service offerings. E-Marketplaces and PSPs realised that they have to add services and functionality in future. Currently available EPC solutions are still some way from covering the entire spectrum of procurement requirements. It was also found that e-Procurement of complex modules with high asset specificity are more difficult to proceed by EPC because the parts are rarely sourced entirely on the basis of price, but on concept competition, supplier capabilities and in most cases single sourcing. Lapidus (2000) assumes that only 20% of sales in the automotive industry are commodity purchases, which would be more suitable for EPC due to their lower asset specificity. Some conflict with electronic purchasing consortia was identified in the concentrated auto industry, with its module

structure, fierce competition and overcapacity and therefore take-up of EPC among e-Marketplaces / PSPs in this industry is relatively low.

Effective participation in electronic purchasing consortia has the potential to enhance competitive advantage in the automotive industry, but this potential is limited due to e.g. the concentration of the sector (legal issues), cultural impediments and technical factors (modularised assembly). More horizontal integrated and fragmented industry sectors such as the electronics industry are better suited to adopt EPC. Moreover, the electronics industry with its high-velocity product cycles and swings in demand have aggressively embraced outsourcing, contract manufacturing and reintermediation, which may contribute to the higher level of EPC implementation. However, e-Marketplaces / PSPs further specified that many purchasing organisations have not yet evolved to the stage where they are joining e-Marketplaces / PSPs in any significant numbers. They will have to overcome this fundamental hurdle before strategic sourcing teams are joining EPC and applying strategic leverage on the supply base.

## *7. Conclusion*

As firms are increasingly adopting ICT in their supply chain operations, the need to empirically research EPC was identified. Although it was demonstrated that EPC may add to competitive advantage and result in an average positive return on investment, sophisticated employment and diffusion of electronic purchasing consortia is still very much at a developmental stage in industry. From the research, it is apparent that EPC, despite limitations, can be a valuable strategic tool worth consideration inside an integrated supply chain model.

While dependant on industry sector characteristics, the model of electronic purchasing consortia can represent a strategic procurement direction for the future and is developing in an evolutionary rather than in a revolutionary manner. The findings and the developed framework represent a starting point for further EPC theory development and indicate that EPC is a rich, multi-faceted domain. However, much work still needs to be carried out if the use of this type of electronic network is to be more widely adopted in industrial firms. Electronic purchasing consortia are still in their infancy and research is still in conceptual and theoretical flux.

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