Electronic marketplaces and innovation: the Canadian experience

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Abstract: This paper examines electronic marketplaces as one 'digital economy' innovation. Great expectations existed for electronic marketplaces in the late 1990s, leading to the establishment of hundreds of new venues for B2B buying and selling. It was feared that the improved efficiency over traditional market mechanisms meant existing business relationships and methods were doomed. Another concern was voiced; namely that smaller nations and peripheral regions would lose trade to electronic marketplaces in central locations. These issues are examined in a study of electronic marketplace innovation in Canada, leading to an assessment of their prospects there, as well as more generally.

Keywords: electronic marketplaces; innovation; B2B; Canada; SMEs; international trade.

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1 Introduction

Hundreds of electronic marketplaces (e-Ms) have been established in the past few years but the future of this new economic form is unclear. Some analysts forecast that e-Ms will transform the way business is done and account for a significant portion of trade [1], while others note that e-Ms are closing because they do not meet the needs of sellers and buyers [2]. These (and other) differing views indicate that considerable technical and commercial uncertainty surrounds e-Ms, thus preventing these vehicles for B2B trading from moving into the 'take-off' innovation stage. These themes are expanded on in the paper, which also examines e-Ms from a Canadian standpoint.

A Canadian focus is recommended due to several factors. First, Canada's economy is different from those of other G-8 nations, making it worthy of study in relation to e-Ms. Second, Canada's dependence on trade suggests that it is a good venue for looking at the possibility that e-Ms will divert trade. Third, Canada has sought to be a leader in e-commerce and it is informative to see whether this aspiration is reflected in the establishment of e-Ms. A final factor should also be mentioned: since the literature on e-Ms is almost exclusively written from a US standpoint, research from other countries is warranted.

The paper is structured as follows. In the next section, the logic for the establishment of e-Ms is briefly described, a number of different typologies outlined, and success factors noted. The second section discusses the characteristics of the Canadian economy relevant to an examination of e-Ms. In the third section, a study of Canadian e-Ms is presented. The research methods are noted and findings described. Thirteen case examples are included to illustrate e-M activity in Canada. In the final section, the general and Canadian research threads are drawn together and the prospects for e-Ms and innovation assessed.

2 Electronic marketplaces

The three central functions of markets are

1 matching buyers and sellers

2 facilitating the exchange of information, goods, services and payments associated with transactions

3 providing an institutional infrastructure, such as a legal and regulatory framework, to enable efficient market functioning.

Intermediaries, typically, enable the first two functions to be carried out, whereas government is prominent with regard to the third function. Internet technology is expected to change markets because functions will be performed more effectively and at lower cost, leading to 'friction-free' venues for trading [3]. A large literature on e-Ms has appeared, but the newness of e-Ms means that most writings are speculative and anecdotal, as opposed to scientific and empirical. Further, the terminology employed can be confusing, with words used inconsistently and sometimes at cross purposes. A number of descriptive and analytical schemes have been proposed as a way of understanding e-Ms: these are briefly examined below.

2.1 Marketplace types

Many companies have embraced internet technology and new market structures are emerging.

Mahadevan [4] distinguishes between portals, market makers and product/service providers. Market makers are the equivalent of e-Ms, in that they build a community of buyers and sellers and also facilitate transactions in various ways.

The *scope* of e-Ms provides a useful starting point. Vertical e-Ms serve the distinct needs of particular industries. In contrast, horizontal e-Ms run across several or many industries. Common buyer needs characterise these markets and are addressed through the supply of standardised goods and services. A distinction has also been made concerning *management* of the e-Ms (or exchange) with four types identified in US research [5]. Buyer-managed exchanges have been established by large buyer organisations and sourcing networks. Large producers and distributors that serve fragmented markets populated by small buyers have set up supplier-managed exchanges. A third type of exchange is independent of buyers and suppliers. Distributors/market makers provide a match making and transaction capability. Sometimes these exchanges specialise by transaction type (e.g. auction houses vs. real-time bid/ask). Finally, content aggregators build and maintain multi-vendor, electronic catalogues. This adds value in a world where paper-based, incompatible, user-unfriendly catalogues prevail. Other e-M typologies and models have been proposed that focus on *value creation* and on the *purchasing situation* [6]. The latter typologies provide an important reminder that, in some instances, efficiency (i.e. price) may be a less critical purchase consideration than, for example, brand or reliability [7]. Another important consideration in many B2B markets is that relationships between buyers and sellers often assume great importance, for both corporate and personal reasons [8].

2.2 Ownership forms

Early e-Ms planned to serve buyers and sellers *via* a neutral arrangement and were referred to as ‘independent’ or ‘public’ marketplaces. Many recent failures were of this type and resulted from there being an insufficient number of adopters to create a viable marketplace [9]. This experience led to two newer forms of e-Ms that are termed industry- (or consortia-) led exchanges, and private trading exchanges.

Industry-sponsored e-Ms have an advantage over independent e-Ms because of the deeper pockets of their corporate sponsors, as well as guaranteed business (or liquidity) [10]. At the same time these e-Ms have also created high expectations and delivered weak performance to date. *Private* trading exchanges (PTX) are more recent. Described as “the application platform on which a company builds its trading interface to both suppliers and customers *via* the internet,” this is seen to be an area of development for large companies. It is expected that companies employing PTXs will be insulated from many of the unknowns as B2B commerce evolves over the next few years [11]. Clearly, e-Ms are evolving over time and in light of experience.

2.3 Success factors

Although e-Ms have a short history, studies that evaluate success factors have begun to emerge. One study likens e-Ms to fragile ecosystems where the success of the entity

depends on the success of each of its participants. A number of key success factors are proposed including: developing a critical mass of transactions; balancing the interests of participants; maximising member benefits; and implementing features that create advantage and 'stickiness'. The study concludes that few e-Ms will be able to meet these criteria, leading to a smaller number of larger e-Ms in the future [12]. Another study is critical of some types of e-M, judging that few are structured to deliver long-term value to participants [13].

These (and other) studies cast doubt on the viability of some e-M types. Collectively, the literature suggests that e-Ms face a turbulent and uncertain future as companies strive to deploy internet technology to improve current market processes. We will return to this theme in the final section of the paper. We now turn our attention to Canada, outlining some of the factors that are germane to the adoption and use of e-Ms in the Canadian economy.

3 The Canadian context

3.1 Background

The prospects for e-M innovation in Canada should be seen against the backdrop of the economy, which in relative terms is small and open, highly dependent on the US, and slow to adopt new business technologies and practices. With a 1999 Gross National Product of US$591 billion, Canada's economy is the ninth largest in the world but, with the exception of Russia, lags those of other G-8 members by some margin [14]. International trade in goods and services represents about 71% of Canada's Gross Domestic Product, a much greater degree of trade sensitivity than other G-8 countries. Much of this trade is intra-corporate, which reflects the rationalisation of North American industry and markets, and US ownership of Canadian firms.

The USA and Canada have the world's largest bilateral trade relationship, totalling $489 billion in exports and imports of goods and services in 2000. Canada and the US are each other's largest trading partners: Canada purchases about one-quarter of US exports, and about 87% of Canadian exports go to the US. The US is by far the largest source of foreign investment in Canada, accounting for 64% of direct investment in the country, and half of Canadian foreign direct investment abroad is in the US [15]. Canada sought to protect its economic interests in the US through a Free Trade Agreement in 1989. This was expanded to include Mexico (in the North American Free Trade Agreement or NAFTA) in 1994.

Canada's economic performance has been affected by falling productivity and innovation. In productivity terms, Canada slipped from second place in 1976 to fifth place two decades later. Canadian productivity levels are presently about 15% lower than those in the US and the gap is not being narrowed [16]. Productivity growth will require the application of new knowledge and techniques but, again, Canada's record is not stellar. On several measures of innovation, Canadian performance in 1999 was among the lowest of G-8 nations [17].

These aspects of its economy make Canada quite vulnerable to the establishment of e-Ms. In relative terms, Canada

1 is not an economic heavyweight

2 its larger companies exhibit high levels of foreign ownership

3 business is highly dependent on the US market.

Collectively, these points suggest that, should e-Ms come to be widely adopted and account for significant global business, it is unlikely that major e-Ms will be owned and/or operated by Canadian companies. Further, the tardiness with which industry has adopted innovative business practices suggests that e-Ms may develop more slowly in Canada than in leading countries.

3.2 B2B online

We now examine the development of online B2B in Canada. A mix of forecasts and survey data present contrasting perspectives. As is the case elsewhere, it is estimated that online transaction methods will become increasingly important in Canada, reaching $272 billion (or 18%) of all B2B sales by 2005. E-Ms are seen as a key element in this transition, accounting for 51% of online sales [18]. Although progress has been made, it is reported that Canadian companies have been passive in responding to e-business opportunities [19]. A distinction should be made here between large firms and small and medium-sized enterprises (SMEs). It is expected that large firms will more readily embrace internet technology – including e-Ms – particularly where this is part of a corporate-wide initiative that is led by US or international owners.

The picture is less clear for SMEs, which are challenged by the technology-based changes that are transforming the industrial landscape. Because these companies are more managerially, financially and technically constrained, they are often slow to adopt new practices. Yet, these companies are important in terms of numbers and employment growth. Companies with less than 100 employees account for 98% of Canada's business establishments, 41% of employees and more than three-quarters of the net employment growth in recent years [20]. In terms of the digital economy, the uptake of internet technology by SMEs in Canada is growing. The incidence of e-mail usage, website operation and online buying and selling is on the increase but there is scope for wider adoption. A lack of conviction about the benefits and low interest on the part of customers are the leading reasons given for non-adoption [21].

International trade is expected to move increasingly online and, given the sensitivity of Canada's economy to trade, this topic merits examination. Relatively few large companies account for the bulk of exports. Only 5.3% of all exporters exceed $30 million in exports annually, but they account for 82.5% of total exports by value. These are companies such as Ford, Michelin or Pratt and Whitney, whose Canadian subsidiaries are integrated into international production and marketing systems. Such companies may be expected to lead or participate in industry-sponsored e-Ms. At the other extreme, small-scale exporters (i.e. those doing less than $1 million annually) represent 62.5% of exporters but only 1.5% of the total value of exports [22]. The use of internet technology is much lower among this category of company, with many still new to even domestic e-commerce. Limited information is available at present, but Canadian SMEs that have embraced the internet appear to be more export oriented, with data showing

that 'e-businesses' sell in more distant markets than their offline counterparts [23]. The internet has been successfully used by Canadian SMEs either to develop or solidify positions in international markets [24]. However, the internet is no panacea: establishing a website or joining an e-M does not convey a competitive advantage, nor does it turn a domestically oriented company into an exporter [25].

Given the composition of Canadian exports, what has been said about the future role of e-Ms? Forrester Research predicts that Canada's exports will be significantly impacted by e-Ms and presents three reasons why much of this business will flow through the US. First, US e-Ms have a significant first-mover advantage in terms of recognition and critical mass. Second, considerations of market size and reach will lead Canadian companies to join US-based e-Ms, rather than those in Canada. Third, a low Canadian dollar, NAFTA and the historical importance of the US as an export destination, almost guarantee Canadian company interest in US e-Ms [26].

We have described key features of the Canadian economy that are expected to affect the level and rate of adoption of an important digital economy innovation, namely e-Ms. This led to some ideas for further examination. These include: the vulnerability of the Canadian economy to e-M developments; the scale possibilities presented to exporters by e-Ms in key locations; and the viability of e-Ms with a national or sub-national focus. These are questions that will be of interest in other countries that present limited market opportunities, non-dominant industrial competitors, and a dependence on international trade, e.g. Australia, the Netherlands and Sweden.

The present study also provides an opportunity to assess questions of a more general nature. For example, have e-Ms delivered the benefits promised? Will the innovation 'take-off' stage be reached? When? In the next section we describe our research on Canadian electronic marketplaces and present case studies of representative e-Ms.

4 Canadian electronic marketplaces

4.1 Goal and method

The starting point for this study was the identification of Canadian e-Ms, and US- or internationally-owned e-Ms with significant Canadian involvement. No comprehensive list or database was in existence. We developed ours to achieve as complete a listing as possible through a wide-ranging search of online business literature databases and interviews with a number of expert individuals who had been identified by industry personnel and government officers. Following the identification phase, the resulting e-Ms' websites were inspected to ensure that they met the criteria for inclusion. For those that did, further information was frequently available through 'news' and 'about us' areas of the website. Where necessary, contact was made with companies to complete the information collection process. For each e-M, the tombstone data collected included: location, ownership, type of e-M, year established, size, revenue model, volume of transactions, products/services, companies targeted, market focus, and key features and benefits. From documentary and interview data, a picture was developed of each e-M in mid- to late-2001. In the sections below, we first characterise the e-Ms in terms of ownership and type, and, second, provide a brief case study of representative e-Ms.

4.2 Electronic marketplace types

Forty e-Ms were identified and are profiled in Table 1. We modified typologies used in US research to create four categories of e-Ms (1) buy-side, (2) sell-side, (3) market maker or (4) coordinator e-Ms [27]. The 40 e-Ms identified were assigned to one of these types. *Buy-side* e-Ms are those where purchasing organisations have taken the initiative, usually with the motivation of aggregating purchasing power to create efficiencies (i.e. drive down prices). *Sell-side* e-Ms result from the aggregation of suppliers' offerings so as to present a broader and deeper selection for prospective buyers. These are sometimes developed in concert with, or as a replacement for trade publications and other paper-based systems. The result may resemble an industrial 'mall' or catalogue. *Market maker* e-Ms are neutral in their orientation: their purpose is to create efficient markets that benefit buyers and sellers. In order to succeed, they must bring sufficient numbers of buyers and sellers together so as to create liquidity. Market makers usually offer ancillary services so as to provide additional value to participants. Finally, *coordinator* e-Ms occur when a consortium of large buyers look for more than procurement savings. They usually have broad goals, often couched in terms of collaborative commerce and supply chain management. Essentially, coordinator e-Ms are an attempt by dominant firms in an industry to impose order across a system so as to ensure that efficiency gains are enjoyed. Consequently, these e-Ms are the most ambitious and, perhaps, most likely to attract industry and regulatory attention.

Table 1 Canadian e-Ms identified in study

Name	*Owned/Type*	*URL*	*Industry*
Aeroxchange	I/CE	aeroxchange.com	Airline
Aginfonet Canada Corporation	C/MM	aginfonet.com	Agriculture
AgraLink Exchange Ltd.	C/MM	agralink.ca	Agriculture
Agri Place Inc.	C/MM	agriplace.com	Agriculture
Alberta Watt Exchange Ltd.	C/MM	wattexchange.com	Electrical power
ATT Canada Marketplace	C/SS	attcanadamarketplace.com	Horizontal
Bar-eX Communications Inc.	C/MM	bar-ex.com	Legal
BellZinc	C/MM	bellzinc.ca	Horizontal
bizSmart	C/SS	bizsmart.com	Horizontal
buildingweb Inc.	C/MM	buildingweb.com	Construction
Buysalvage.com	C/MM	buysalvage.com	Salvage equipment
CATA Small Business Exchange	C/SS	cata.com	Advanced technology
Covisint LLC	I/CE	covisint.com	Automobile
E2open	I/CE	e2open.com	Computers & electronics
eBiz4Biz.com	C/MM	ebiz4biz.com	Export
eBuild.ca	C/MM	ebuild.ca	Construction
Empori.com	C/SS	empori.com	Horizontal

Table 1 Canadian e-Ms identified in study (Continued)

Name	*Owned/Type*	*URL*	*Industry*
e-STEEL	US/CE	e-steel.com	Steel
GHX Canada	US/SS	ghx.com	Healthcare
Gofish.com	US/MM	gofish.com	Seafood
Interealty	C/SS	interealty.com	Real estate
Mediagrif Interactive Technologies	C/MM	mediagrif.com	E-commerce
MERX	C/MM	merx.cebra.com	Government tendering
Natural Gas Exchange Inc.	C/MM	ngx.com	Oil & gas
NetThruPut Inc.	C/MM	netthruput.com	Oil & gas
Onvia	US/SS	onvia.com	Horizontal
Partslink	C/MM	partslink.com	Automotive
Petroleum Place	US/SS	petroleumplace.com	Oil & gas
Procuron	C/BS	procuron.com	Horizontal
Quadrem	I/CE	quadrem.com	Mining
RailMarketplace.com Inc.	I/CE	railmarketplace.com	Railroads
Roughneck	C/MM	roughneck.ca	Oil & gas
ShipAhead.com	C/MM	shipahead.com	Shipping
SourceCAN	C/SS	sourcecan.ca	Horizontal
TD MarketSite	C/SS	tdmarketsite.com	Horizontal
The Ag Dealer	C/SS	agdealer.com	Agriculture
thequotaexchange.com	C/MM	quotaexchange.com	Export
Transora	I/CE	transora.com	Consumer packaged goods
Truck and Trailer Online	C/SS	truckandtraileronline.com	Automotive
Vertical Builder	C/MM	verticalbuilder.com	E-commerce

C = Canadian-owned; I = internationally-owned; US = US owned; BS = buy-side; CE = coordinator e-M; MM = market maker; SS = sell-side.

Of the 40 e-Ms we were able to identify, 29 were Canadian-owned or operated and 11 were US- or internationally-owned or operated, but had significant Canadian involvement. The scope and type of these e-Ms is summarised in Table 2. Sharp differences are seen: Canadian e-Ms tend to be horizontal in scope, with market maker e-Ms predominating. In contrast, US/International e-Ms are almost exclusively vertical in scope and of the coordinator type.

Table 2 Characteristics of Canadian e-Ms

	Characteristics	*Canadian*[1] *(n = 29)*		*USA/International*[2] *(n = 11)*	
Scope	Vertical	19	66%	10	91%
	Horizontal	10	34%	1	9%
Type	Sell-side	1	3%	0	0
	Buy-side	9	31%	2	18%
	Market maker	19	66%	2	18%
	Coordinator	0	0	7	64%

[1]Canadian-owned or -operated.

[2]Foreign-owned but with significant Canadian involvement.

4.3 Electronic marketplace cases

Illustrative examples are now provided of a Canadian, US or international e-M, for each type identified.

Canadian: Buy-side. One example of this e-M type was found: Procuron. Founded by a group of banks and telecommunications companies, namely Bell Canada, CIBC, Scotiabank, Mouvement des caisses Desjardins and BCE Emergis, Procuron began to offer purchasing services in November 2000, providing one-stop sourcing of 6,000 indirect business goods and services (travel agency services, car rental, airline services, PC hardware and software, and office supplies). The founding members pledged to procure one billion dollars' worth of goods and services through Procuron in its first year of operation, with the expectation that the site would be profitable within one year. The intent is to move Procuron quickly from a consortium-based buy-side e-M offering strategic sourcing and volume discounts to a 'national' B2B procurement site open to a broad range of qualified suppliers and many purchasers.

The strategy of the founders is to use their purchasing size to gain volume discounts from large suppliers (40 by the end of 2001) and pass some of the savings on to other smaller firms. In April 2001, 200 companies had registered as purchasers. Buyers pay no fee to use Procuron but suppliers are charged a finder's commission. Various value-added services such as bill presentment, payment, insurance and credit will be added as volume increases, and BCE Emergis will earn transaction fees.

Canadian: Sell-side. Nine cases fell into this category. Two are described below.

Toronto-based *Empori.com* has a novel business model. It allows tenants of office buildings (usually SMEs) to benefit from discounts on group or bulk purchases of office supplies and services from authorised suppliers. All purchasers get the same discount. The supplies are delivered to depots in the basements of the office complexes, so there is no problem with pickups. The model only works in urban areas and with 'low touch' items such as printer toner, bottled water, paper, shredding, etc. The idea will be moved to 'medium touch' items such as catering as the model catches on. 'High touch' items such as marketing services are unlikely candidates for this model.

The suppliers are big office supply companies such as Corporate Express and Crystal Springs, which believe that online purchasing is becoming important and small office supply distributors are disappearing. The big suppliers are forming alliances with several

e-Ms servicing small businesses because they do not know which ones will survive. Buyers like the model because it simplifies the purchasing process and drives costs down.

Empori's B2B division was recently sold to BellZinc, another e-M. Oxford Properties, Empori's owners, continue to operate a B2C division (see below). BellZinc made the purchase because 500 Empori users were driving more business than 65,000 users of its own BellZinc site. This may be partly explained by the fact that Empori employs customer service representatives to work with buyers, whereas BellZinc relies on an e-mail response system. Whether this will change as the two operations are merged is unclear. Following the sale of the B2B division to BellZinc, Empori is continuing in the B2C space. Its CEO is from retailing and is comfortable working in this area. The plan is to extrapolate the business model to large apartment complexes. Consumers can purchase online and then pick up the items in a basement depot at night [28].

The Ag Dealer is a clicks-and-mortar business that combines a paper-based farm equipment advertiser (250,000 copies) and extensive use of the internet to sell farm equipment. The traditionally circulated advertiser is critical in driving business to the e-M and, in the company's view, differentiates it from less successful agricultural marketplaces that operate in an entirely virtual manner. Equipment is advertised through the print version (for a fee) and in the electronic version (at no cost). Ag Dealer does not host online transactions but rather connects buyers and sellers who then conclude their deals on the phone or in person. Dealers find that from 10% to 40% of their leads are coming from the e-M. An online auction component was tried but has not done well because first, farmers do not trust electronic payment methods, and second, farmers are less interested in efficiency and market fluidity than in the social and community dimensions of auctions (meeting neighbours, etc.). Also, since agricultural equipment represents a major purchase, physical inspection is critical.

The business was started in 1998. The founding entrepreneur retains 20% ownership of the company with the balance owned by telephone company SaskTel. Ag Dealer recently extended its publishing and internet business model to agricultural land in conjunction with Landmarketer.com of London, Ontario. The company feels that online purchasing will eventually be accepted in the farm equipment industry. Farmers after all were the main constituency for the Sears catalogue 100 or more years ago. For now, however, the bricks-and-clicks business model works well for The Ag Dealer.

Canadian: Market maker. This was the dominant type among Canadian e-Ms with 19 cases. In view of the diversity in the range of e-Ms, four of these are presented. *BAR-eX* is an e-M for legal professionals and those providing goods and services to law firms. It is a joint venture of Teranet Enterprises Inc. (90%), the Law Society of Upper Canada (5%) and the Lawyers' Professional Indemnity Company (5%) [29]. The e-M was pre-launched in January 2000 and offered services such as event calendars, e-mail, discussion forums, utility services (e.g. title and execution searches), and online access to government services. In its first year of operations, BAR-eX carried out research to determine which features would be most beneficial to users. As a result of this process, online procurement was added to the site in February 2001. Lawyers and their staff can now review catalogues, order products from multiple suppliers and check the status of orders. Product and service offerings include legal software, forms and legal books as well as more general office supplies, equipment and materials. Legal services (e.g. legal research, expert witness sourcing) will be added in the future. The legal industry in Canada spends about $4 billion annually on goods and services, and automation of procurement is expected to create substantial savings. Initiatives such as BAR-eX level

the playing field for solo practitioners and smaller law offices, permitting them to use the internet to enhance their business operations. BAR-eX currently has 4,000 registrations and attracts over 2,500 unique users and 40,000 page views each week. Suppliers include Dye and Dunham, Irwin Books and Lyreco.

Mediagrif is Canada's most diverse and arguably its most successful exponent of e-Ms. Mediagrif is unusual in that it develops and operates e-Ms. Headquartered in Montreal, and with offices in Canada, Europe and the US, it is presently involved in several industry sectors and operates 10 e-Ms that have attracted 8,700 participants from 60 countries, and employs more than 500 people. Mediagrif had a very successful FY2000, generating $68.7 million in revenues and $21.0 million in profits. The fact that its performance ran counter to the general trend among B2B e-Ms led Forrester Research to issue a recent report on the company. Six factors were viewed as instrumental in the company's success. These were

1 proprietary technology
2 operational expertise
3 influential partners
4 frugal spending
5 fanatical recruitment
6 incremental evolution [30].

The company's origins go back to 1996 when it established The Broker Forum, which has become a leader in electronic components trading. Since that time, several other e-Ms have been launched that focus on trade in components, equipment and supplies. Recent developments have moved the company into newer fields such as e-Ms for licensing, merchandising and television rights, as well as wines and spirits. A strategic alliance with Royal Bank of Canada was announced in April 2001. The newly formed company will invest up to $2 million to acquire a controlling interest in NET3F Inc., a company that offers software solutions to the automotive sector and to facilitate buying and selling of all types of original equipment, aftermarket and recycled automotive parts. Another development expected is the application of Mediagrif's know-how to the growing field of private trading exchanges.

MERX is an unsung leader among Canadian e-Ms. MERX is an online tendering system developed by Cebra Inc. (a Bank of Montreal company) for the federal government in 1997. More than $8 billion was transacted through the site in 2000, and its reach now also encompasses provincial governments, municipalities, academic institutions, schools and hospitals. MERX has about 50,000 subscribers, 80% of which are SMEs. Online tendering occurred for the first time in 1992 but subscription fees of about $600 discouraged participation by many small companies. MERX now charges $5.95 monthly. Companies can browse contract opportunities and either download documents or receive these by courier. MERX also allows sellers to see who bid on and won each contract and offers a bid matching service based on key words that alerts companies to relevant opportunities.

Online tendering has been a boon to smaller suppliers. Previously, considerable effort and expense was incurred in tracking government contracts *via* newspaper postings and contacts with government buyers. Selling to government is now essentially open to all

companies. A recent survey of users indicated that 94% of respondents were satisfied with MERX. The success of MERX has prompted plans to develop additional business, including a B2B auction service, bid submission and payments. The possibility of expanding MERX coverage to private and public sector procurement across North America is also being considered.

NetThruPut is an independently operated affiliate of Enbridge Inc., which dominates oil transportation in Canada through a 1.8 million barrel-per-day pipeline system. Founded in January 1999 and formerly named the Enbridge Petroleum Exchange Inc., NetThruPut is the Canadian leader in internet-based crude oil trading systems. Some 70 users have been signed up, comprising most of the significant producers, shippers or refiners in Canada. It handled trade valued at $200 million in 1999, with a threefold increase expected for 2000. The e-M allows oil traders to buy and sell oil with other system users on an anonymous basis, guarantees both delivery and payment, and provides access to oil market information. The current objective of the e-M is to exploit its first-mover advantage in Canada. A move into the US market was considered but the number of internet star-ups targeting the business has deterred expansion to date. Other international opportunities are under consideration and the recent purchase of 30% of the e-M's equity by Hong Kong based Circuit Technology Limited could open doors in Asia. There is also a possibility that NetThruPut could expand its operation to offer an integrated service from wellhead to the refiner. However, at present it concentrates on crude oil only.

US/International: Sell-side. Two cases of this type were found; one is described here. *GHX Canada* is an offshoot of the Global Healthcare Exchange, created in March 2000 by five of the largest US device and medical surgery suppliers. The founding companies were Johnson & Johnson, GE Medical Systems, Baxter International Inc., Abbott Laboratories and Medtronic Inc. These companies supply 70% of all equipment and supplies used by hospitals and service 90% of hospitals worldwide. A year later, membership numbers 70 firms, which collectively market 750,000 products and account for US$70 billion in sales.

GHX was a response by manufacturers to the incursion of third-party online providers such as medibuy.com and neoforma.com. GHX successfully completed trials in December 2000, following which the e-M was expanded to encompass 21 integrated delivery networks and 160 hospitals in the US. Operations will grow further as new buyers commit to the e-M. GHX expanded its operations to Canada in 2001 through the Canadian subsidiaries of the founding US companies. Europe is also a target with GHX initially focusing on France, Germany and the UK. In each market buyers are offered online ordering with customer-directed distribution, online enquiry of order status, online order confirmation, product catalogues and access to contract terms. The major benefit provided by the e-M is simplicity and efficiency; buyers are able to go to one site for everything they need. Supply chain inefficiencies in health care are estimated to cost US$11–13 billion annually.

US/International: Market maker. Two e-Ms fell into this category and one is described. *Gofish.com* is a US-based market maker. The Canadian connection is through SeafoodAlliance, which is a consortium of nine seafood companies, five from the US, two from Canada, and one each from Iceland, New Zealand and the UK. The Canadian companies are Clearwater Fine Foods and High Liner Foods Inc., both headquartered in Nova Scotia. The latter company was the driving force in the establishment of the consortium and its CEO currently acts as SeafoodAlliance's chairman. The consortium

accounts for $4 billion of sales in the seafood industry. Membership is open to any company in the industry. Following its formation in May 2000, SeafoodAlliance conducted a six-month study into the feasibility of developing an e-commerce presence. It was concluded that joining an existing seafood e-M made more sense than creating a new platform.

Subsequently, SeafoodAlliance announced a partnership with industry leader Gofish in February 2001. This agreement allows SeafoodAlliance members to use Gofish as much or as little as they wish; however, they are not permitted to use rival seafood e-Ms (such as FishMonger). As well as providing a vehicle for seafood sales, Gofish will develop MRO and non-seafood procurement modules to help members achieve tangible savings in their own purchasing of inputs. This is the area of application for Seafood Alliance members currently. The Gofish site permits buyers and sellers to exchange information and to do business, aided by credit reporting and insurance functions. Gofish is headquartered in Portland, Maine, and has offices in Seattle, New York, Norway and Thailand.

US/International: Coordinator. This type was most common with seven cases found. Two cases are discussed below. *Aeroxchange* is an e-M formed by 31 of the world's major airlines. Based in Dallas, Aeroxchange founding members include Air Canada, Cathay Pacific, FedEx, Japan Airlines, Lufthansa German Airlines, Northwest Airlines and Singapore Airlines, which have collectively invested over $50 million in the project. Aeroxchange has developed four core product suites: strategic sourcing, inventory management, maintenance management and rotable reliability (data on the reliability of technical components). The objective of Aeroxchange is to develop the internet's most comprehensive supply-chain management, e-procurement and information services solutions for aviation goods and services. It is expected that the e-M will handle more than $45 billion annually of the goods and services bought by member airlines, excluding planes and fuel. Air Canada was instrumental in establishing Aeroxchange and its chief purchasing officer is the present chairman of the e-M. Air Canada anticipates saving $15 million annually for purchases ranging from engines to food services. Aeroxchange began operations in October 2000 and went live in February 2001.

Covisint is a global e-M founded by DaimlerChrysler, Ford and General Motors. Renault/ Nissan and Peugeot/Citroen have also joined the group. The goal of the e-M is to provide the automotive industry with leading collaborative product development, procurement and supply chain tools that give its members the ability to reduce costs and bring efficiencies to their business operations. The potential gains from greater coordination are substantial. A car has an average of 5,000 parts and the auto industry operates complex and outmoded supply chains. A large auto company processes one million invoices annually, which presently cost $150 each. An e-M offers the possibility of reducing this cost to $15 per invoice. Covisint was announced in February 2000 and began operations in November 2000, following Federal Trade Commission anti-trust clearance a month earlier. Covisint is located in Southfield, Michigan and has established offices in Stuttgart and Tokyo. The first year has been a trial for Covisint, plagued by internal and start-up difficulties. DaimlerChrysler, Ford and General Motors made US$1.5 billion purchases through the e-M in 2000. The goal for 2001 was US$75 billion. At present, 90% of business is transacted *via* auctions and catalogue orders. Online supply chain and automated back-office services will be emphasised in the future. Some 800 of 8,000 suppliers have registered to use the e-M. Suppliers are reported to be reluctant partners, unhappy about pressure on their profits, and fearful about the loss of

proprietary information through design collaboration processes. Suppliers continue to use online auctioneer FreeMarkets, to ensure there is a competitor to Covisint. The establishment of Covisint is a significant development for tier-two and tier-three suppliers in Canada.

5 Discussion

5.1 Canadian research findings

In the previous section, data and case studies were presented on e-Ms in Canada, reflecting the situation late in 2001. In terms of the types identified, Canada seems to have a particularly vigorous development of *market-maker* e-Ms in the agricultural and natural resource sectors. They appear to be examples of a Canadian ability to put together packages of technology, talent and financial support in pursuit of perceived market opportunities. Several e-Ms have developed novel business models that are producing value despite the present lack of interest from the investment community. The e-Ms are predominantly vertical in their scope and focus on national or sub-national markets. Fewer cases of *sell-side* B2B e-Ms were found. Although the potential is considerable these e-Ms must operate on a substantial scale to reach profitability. Only configurations of very large players (typically banks, telecommunications companies and technology suppliers) have the capacity to operate at this level, and a market like Canada is able to support a small number of entities. The same is true for *buy-side* e-Ms. Significant amounts of purchasing power must be aggregated in order to create the necessary liquidity. For the most part, sell-side and buy-side e-Ms were horizontal in their scope and national or sub-national in focus. The fact that no *coordinator* e-Ms were found in Canada can be attributed to the relative scarcity of concentrations of large firms that predominate within an industry. The larger Canadian companies that are active are participants in US or international coordinator e-Ms. Alcan for example is a member of Quadrem and McCain's is active in Transora. Coordinator e-Ms are ambitious in their intent, with supply chain management and collaborative commerce often targeted along with purchasing. E-Ms of this type require substantial investments and are evolving more cautiously than expected, with members adopting a wait-and-see approach.

The research points to some limited adoption of e-Ms in Canada. It is difficult to know whether the 40 e-Ms identified is an appropriate number for the economy in question. The characteristics appear to make sense: the greatest incidence of e-Ms is in the market-maker category, using technology to deliver value to domestic sellers and buyers in specific sectors. Far fewer sell- and buy-side arrangements were found, reflecting the difficulty of aggregating sufficient SME business in the smaller Canadian economy. For larger Canadian companies with an export focus, US or international e-Ms were the chosen venue, promising links to the world at large as well as advanced functionality.

Do these results indicate that nations such as Canada that are not economic 'heavyweights' are vulnerable to e-M developments? The evidence from this study does suggest that the centres of gravity for trade in a world that has adopted e-Ms will continue to be located where the dominant firms are active. No Canadian coordinator e-Ms were identified in the research but larger Canadian firms are active in coordinator e-Ms owned by other interests and centred elsewhere. It will be interesting to see whether studies of

other economies produce similar findings. A related question that might be asked is whether it makes any difference who owns an e-M or where it is located. If participation is open to all companies and technical and operational considerations do not disadvantage outside or foreign buyers and sellers, then the answer is probably 'no'. At this time, however, the extent to which e-Ms are truly 'open' and likely to change existing trading patterns is not clear. Consequently, governments are interested in this issue.

5.2 Recent developments

Other questions were posed above. Have e-Ms delivered benefits to participants (and investors)? Will the innovation we call an e-M reach the 'take-off' stage, and if so when? Answers to these questions are not clear-cut but the Canadian experience and recent events are instructive. With regard to benefits, adoption levels are lower than was anticipated prior to the collapse of technology stocks and the slowdown in the world economy. This reflects a lack of conviction by adopters about the benefits to be realised, and while a mid-2002 report reveals that more US companies are purchasing online and making use of e-Ms, levels are still low and trade conducted *via* EDI systems is proving to be harder to shift to the internet than was imagined [31]. Low levels of adoption are also explained by the potential inappropriateness of e-Ms for some types of B2B. Several researchers, for example, question whether e-Ms will ever succeed beyond brokerage situations, where easily described, standardised, low asset-specificity product exchanges prevail [32]. Another barrier to the adoption of e-Ms is political: specifically, by outsourcing to an e-M, companies devalue the role of purchasing professionals, destroy working relationships with suppliers, and have less control [33].

There are positive developments to set against these concerns. US companies continue to invest in information technology. Although spending growth in 2001 was lower than the two previous years, it did grow by 12%, with 94% of companies indicating e-M projects would be sustained or increased [34]. This may be influenced by research showing that early adopters of e-procurement solutions have reduced their purchase costs to a greater extent than later adopters [35]. European e-Ms are also growing, although profitability remains elusive and the future is uncertain [36].

A complicating factor in assessing the situation is the recent nature of the innovation. Although some kinds of e-Ms have existed for decades, these were highly centralised markets such as stock exchanges in which rules and procedures were developed well before the advent of supporting computer technologies. Business experience with e-Ms using widely networked computers is relatively recent. Consequently, the literature is largely descriptive, and little in-depth analysis is available on the development and diffusion of e-Ms within specific industries.

Another difficulty is that the actual business behaviour regarding e-Ms has differed substantially from expectations. Complexity is one explanation. Adoption of an e-M by an industry or group of trading partners requires multiple concurrent changes in business models, practices and relationships. Such change takes time to implement and learn. Adoption of e-Ms is also affected by the availability of other technologies that compete for companies' attention and resources, and they may be regarded as alternatives to e-Ms by firms seeking to improve the top and bottom lines. Examples here include various communication, coordination and transaction-enabling solutions such as collaborative commerce among supply chain partners, management of content within industry portals, enhanced knowledge and document management, and customer relationship

management. In short, companies have not adopted e-Ms on the scale or with the speed anticipated.

One assessment is that far too much was expected of e-Ms, and too quickly [37]. This digital economy innovation was swept up in the hype of the late 1990s. At that time, extravagant claims were made on behalf of the internet and e-Ms: these would be drivers of global trade, would create a 'borderless' world where every company would be instantly global and participants would reap efficiencies regardless of their situation or circumstance. Like other innovations, it will take some time before the success of e-Ms is determined and when it is, the market will decide. At the present time, Canadian and other evidence suggests that there is a place for e-Ms in B2B trade, but on a more modest scale than predicted [38]. E-Ms will achieve 'take-off', probably by 2005.

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38 Since the study was concluded in late 2001, it appears that eight of the 29 Canadian-owned e-Ms have ceased operations. We anticipated that Canadian buy-side and sell-side e-Ms would have difficulty developing sufficient scale to be viable in what are relatively 'thin' regional and sub-national markets. This fear as been confirmed by events in 2002: the only Canadian buy-side e-M (Procuron) and four of nine sell-side e-Ms are no longer in business. In contrast, only three of the 19 market-maker e-Ms (which exhibit more of a specialist or niche-orientation) closed their doors. All 11 US or international e-Ms we identified as having substantial Canadian participation, continue to operate. This is to be expected given their substantial industry support and resource levels. However, Gofish.com appears to have retrenched and reorganised its operations.