STUDIA INFORMATICA 2001
Volume 22 Number 2 (44)

George P. KOWALCZYK
Network Integrators Associates

WEB-BASED E-BUSINESS – AN OVERVIEW

Summary. Reduction in costs and savings of time are major benefits from Web-based e-business. Evolution from portals to e-marketplaces has been presented along with a review of leading technologies. EDI and ERP integration with the Internet is an ongoing process. Despite doubts about economic viability of these solutions opportunities for economic success however exist in the future.

ZASADNICZE ELEMENTY E-BIZNESU

Streszczenie. Wykorzystanie Internetu do transakcji gospodarczych przynosi oszczędności czasu i kosztów. Zaprezentowano ewolucję od portali do rynków internetowych wraz z przeglądem wiodących rozwiązań światowych. Integracja istniejących rozwiązań systemów elektronicznej wymiany informacji (EDI) oraz systemów komputerowego planowania zasobów (ERP) z Internetem dokonuje się już teraz. Ekonomia tych przedsięwzięć jest obecnie poddawana dyskusji, lecz potencjał dla ekonomicznego sukcesu w przyszłości rysuje się wyraźnie.

1. Introduction

The Internet basically is a communication network, which is going to merge voice, video, and data traffic. It has been subsidized by billions of dollars by venture capitalists, ordinary investors, and big corporations, and it still does not pay back. Many Internet services are priced at marginal costs next to nothing. The gap between average and marginal costs is bridged by today's subsidies, which mean business losses.

On the other hand huge amounts of money are spent on expanding Internet infrastructure in terms of building complex Web sites, communication networks, and developing more efficient software products.

Evolution of the Internet in the post-browser era started from simple Web sites of informational nature, evolving through portals to e-business. E-business over the Internet in forms of B-to-C (business to consumer), or B-to-B (business to business) is using diversified e-marketplaces. Integration of EDI (Electronic Data Interchange) systems to B-to-B is ongoing process. There is a wide range of potential benefits motivating enterprises to undertake e-business initiatives.

Interesting movement is observed towards conducting government business through the Internet. Today many governmental agencies are moving beyond offering information-only Web sites to setting up full-service Internet portals. Governments at all levels and across all global regions – from Australia to Manitoba to Berlin – are steadily moving their programs to the Internet and making services available via online portals, seeking to enhance customer-centric service.

Both organizational concepts and broad view at technology and services related to Web-based E-business are reviewed in this publication.

2. Portals

2.1. Definitions

A portal is a Web "super site" that provides a variety of services including Web searching, news, directories, free e-mail, discussion groups, online shopping and links to other sites. It all started with Yahoo way back in 1996, and through personalization became immensely popular among millions of people around the world. For personal use it works fine, however problems arise when one is seeking professional and specialized functions. Searching in a global portal brings thousands of responses that in most part are irrelevant. The scope of a global portal is too broad for effective business operation in niche markets. These global portals such as Yahoo, AltaVista, AOL, Lycos, Excite and variety of others are recognized also as **horizontal** portals.

When the scope of a problem becomes too complex it leads to the idea of decomposition what in essence materialized as a rapid growth of specialized portals embracing a large corporation, one industry, or a branch of economy. Portals limited to a given industry are

recognized as **vertical** portals. Portals limited to a large corporation are recognized as **enterprise** portals.

Thanks to expanding Internet access in offices, homes, libraries, community centers and mobile phones e-Customers will be anywhere. E-Customers are driven by convenience, savings of time, and potential sharing in cost savings.

A portal is really a metaphor for enterprise transformation – customer-centric style. Customer-centric portals have four major attributes:

- Appeal to customers enough to get them to return regularly
- Aggregate information with "one-stop shopping"
- Fulfill customers demands for service in forms of downloads, monetary and non-monetary transactions or instructions for obtaining further information
- Connect portal services to databases integrated in the back office.

2.2. Vertical Portals

The best way to capture a market on the Internet is start with good information, the item most of us go to the Web seeking. The best way to present this information to end-users is to build this information into a vertical portal, complete with community tools and goods to purchase.

Search is a key trouble in using the Internet, and it is one of reasons for having vertical portals. Today's search engines work on a simple principle: create an index of as many Web pages as possible. When you use a search engine to find documents you are actually accessing the pre-built index of pages. Finally over time a completed index is mounted and made available to search users. This process is far from scientific, and pays little attention to the importance or utility of the information.

Portals limited to a given industry would obviously have smaller scope, more focused and relevant search. Business professionals will conduct the majority of the online activities from business-to-business Web destinations focused on their specific industry or sub-industry.

Economy is an issue. Horizontal portals try to attract a great number of visitors, getting their revenues from advertising with rates dependent on number of hits per day or hour. The two primary revenue sources for a vertical portal will be from advertisers (using banner ads and sponsorship, etc.), and from site-based commerce.

2.3. Evolving Portals into e-Marketplaces

Vertical portals are further opening as a path to **B-to-B** (Business-to-Business). B-to-B is defined as transactions between businesses involving anything they might buy and sell, especially: **direct goods** (those that are necessary as raw materials in a production or manufacturing process) and **indirect goods** (goods a company uses to do business but that is not incorporated in its products such as office supplies). Based on familiar browser technology vertical as well as enterprise portals offer end-users "one-stop shopping" for business information and transactions.

Proliferation of vertical e-marketplaces is growing as projected on Fig. 1.

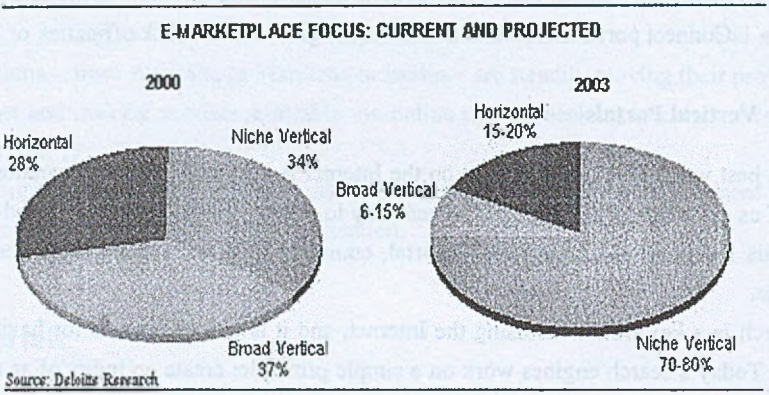


Fig. 1. E-marketplace focus: current and projected
Rys. 1. Elektroniczne rynki: obecnie i przewidywane

Existing processes that tolerate the latency of phone and fax communication are giving way to the real-time global network of the Internet. However this is a slow and arduous process that is not without share of growing pains. B-to-B e-commerce is a very complex undertaking that involves dozens of processes and components. They include: yield management, collaboration, personalization, workflow management, ERP integration, credit approval, logistics, customer service, manufacturing, data intelligence, inventory management, forecasting, and catalog maintenance.

The B-to-B space is still in its infancy in terms of technology development, and corporate development. B-to-B e-commerce is a long-term play, but the fundamentals are solid for delivering exceptional value by improving collaboration and reducing transactional friction among all members of the B-to-B chain. Areas where B-to-B has the greatest appeal are in markets where is high fragmentation.

2.4. E-Government

Governments are in process of moving their services to the Internet [1]. It is now generally acknowledged that e-Government is evolving in stages, with Internet portals becoming the way governments present their information and service offerings so that customers have a single gateway through which to find what they need. Offering services through a portal is an ongoing process that requires governments to use their portals as engines for enterprise transformation. Enterprise transformation can be defined as government reorganizing itself to meet customer demands in the most efficient manner.

In the early stages of e-Government, it was a major breakthrough for governments to make department information available on the Web to cut down telephone inquiries. Since then governments are pursuing the vision of replicating all traditional services through portals to achieve true one-stop shopping. Some cutting-edge innovations are:

- One-stop procurement – end to end processing of purchasing
- One-stop training – rapid electronic learning through low cost courses
- One-stop enrolment – wizard leads customers to many state programs that provide cash assistance

Aggregating services in a single location eliminates the need for redundant functions even offices. A one stop-shopping model applied between different levels of government increases cost savings.

Certain infrastructure has to be in place to provide the most comprehensive service to customers. The most important are: digital signatures and enterprise data sharing. Some implementations already are working in few countries.

Questions however arise whether governments will have enough resources to achieve consistent 24/7 operation, or who should manage the portal. Some examples of using ASP services are however mainly US phenomena. Additional value from increased utilization of some portal services will diminish. Governments are investing in a multi-channel approach to e-Government i.e. face-to-face, telephone, mail, and fax format. Not every customer will be or want to be an online customer.

3. Ways of Doing E-Business

3.1. Legacy Systems

Electronic business (e-business) is a technology enabled application environment to facilitate the exchange of business information and automate commercial transactions. EDI (electronic data interchange) networks represented the first phase of electronic B-to-B e-commerce. Traditionally EDI has comprised three basic components: protocol standard, software and the hardware delivery system. The protocol standard ASC X.12 UN/EDIFACT establishes an agreed-upon language for use between multiple partners in the business chain. The software component enforces the protocol standard and processes the exchanged information. The hardware delivery system comprises servers and network components. However, EDI has evolved from strictly mainframe-to-mainframe communication to a multipoint exchange involving a variety of hardware/software platforms, corporate entities, and information. EDI has been widely used for more than a decade, and remains a central dimension of e-commerce.

EDI is too expensive to implement and run, except for the largest of buyers and sellers. It is estimated that 95 percent of Fortune 1000 companies currently utilize EDI. However, only 2 percent of companies outside of the Fortune 1000 with more than five employees currently use EDI (Source: Meta Group).

EDI has been evolving recently in the presence of technological developments such as eXtensible Markup Language (XML), and proliferation of secure Internet. This evolution is being spurred by the need to overcome limitations of traditional EDI standards and technologies.

As XML assumes an enabling position for EDI, vendors will develop and offer bridging technologies to support the integration of new XML-based and older ASC X.12–based EDI systems between trading partners. Depending upon the type of B2B relationship there are three basic network infrastructure approaches: 1) Value-added networks (VANs) 2) Internet EDI 3) Direct connections

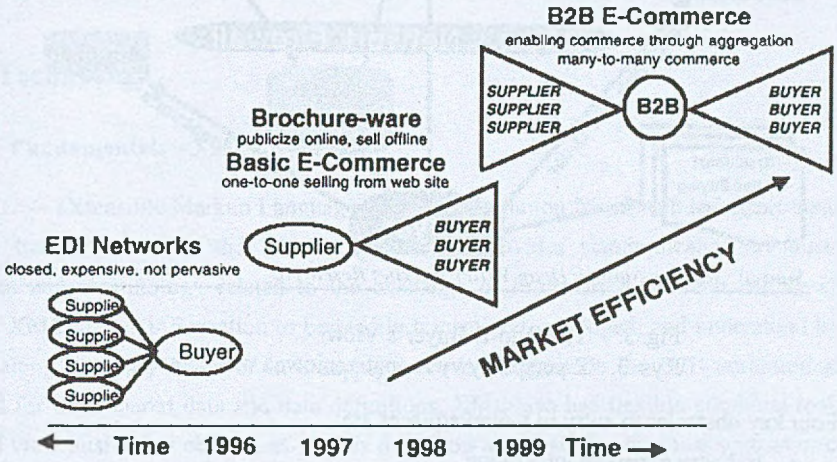
Internet EDI represents a set of technologies, tools, and services such as VPN (Virtual Private Network) that enable EDI transactions to be conducted securely over the Internet. This scenario is an evolution from a VAN configuration in which legacy EDI systems externalize access to the Internet domain. Companies often turn to the Internet in the hope of lowering the communication costs of VAN services.

3.2. Internet Commerce

Online marketing to consumers via the Internet, known as business-to-consumer (B-to-C) e-commerce, is the only one of several forms in the e-business space. Business-to-business (B-to-B) e-commerce includes a variety of applications and networking technologies designed to automate and optimize interactions between business partners.

The main lesson from history is that unique specialized marketplaces exist to serve the needs of common types of professionals. The marketplace for concrete and steel, for example, is very different than the marketplace for surgical equipment.

Evolution of B-to-B marketplaces started with EDI linkages between businesses (Figure 2).



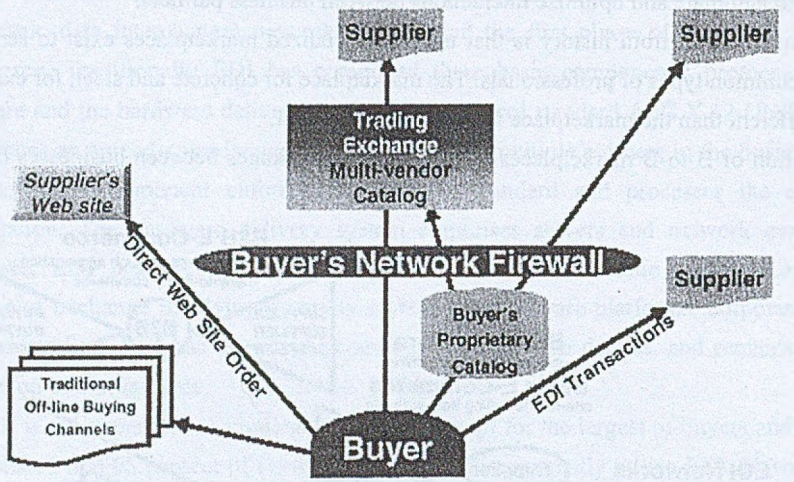
Source: Morgan Stanley Internet Research

Fig. 2. Evolution of B-to-B e-commerce
Rys. 2. Ewolucja form handlu elektronicznego między przedsiębiorstwami

Buy side and sell side solutions represent the next stage in the B2B e-commerce evolution. A sell side solution involves a seller using the web to market products using online brochures or catalogs and accepts online orders. Early leaders and current "gold standards" for sell side solutions include companies like Dell and Cisco, which generate over 80% of their revenues from the web. While order taking on the web is a step in the right direction, companies like 3Com have enhanced their sell side solutions by integrating them in real-time with ERP (Enterprise Resource Planning) and fulfillment applications.

Buy side solutions allow a large buyer to use the web to connect and place orders with a preferred set of suppliers (Figure 3). Buy side solutions address procurement of non-

production goods (e.g. office supplies etc) where the cost of processing a transaction is high compared to the cost of goods being purchased. It is also used by big companies those have lots of muscle in their markets, or groups of smaller companies getting together to act like a big buyer. One example: auto companies buying door handles through a reverse auction.



Source: Morgan Stanley Dean Witter Internet Research.

Fig. 3. The B-to-B Buyer's View
Rys. 3. Z perspektywy zaopatrzeniowca w e-biznesie

Four key obstacles to entry in e-marketplaces are:

- industry expertise integration,
- back-end integration,
- follow-up services and
- technology.

Technology is significant, but not as commonly assumed, because most technologies can be bought off the shelf or licensed through an ASP (Application Service Provider). Domain expertise is critical to understand the distribution channels and know the reasons for the existing inefficiencies. The other big challenge that B-to-B users face is that they have to start connecting their existing back-end financial, accounting, and human resource systems, or ERP. Soon, it will no longer be sufficient to simply show a product in an online catalog and let someone click to buy.

Most forecasts simply project what portion of economy will move to Internet because it may be a faster, cheaper sales channel. What Internet will do to enhance existing markets is

only part of its benefits. There are missing three key ways the Internet will further transform the economy.

- ***Inventory squeezers*** let buyers know in accurate and timely manner the price, availability, and guaranteed arrival date of supplies needed. This will let them eliminate much of the costly buffer inventories.
- ***Value creators*** let idle or neglected inventory that might never sell find a home. Examples are collectibles, vacant spaces, and rare items.
- ***Product creators*** help create products that would never have existed, much less found the right buyer and seller, without the Internet. Examples are patents, and other intellectual property.

4. Technology

4.1. Fundamentals – XML

XML — eXtensible Markup Language — offers a common framework to help companies execute transactions over the Internet [2]. XML provides standardization of business processes and terminology related to the exchange of information between supply chain entities. XML allows information to be readily transmitted, cataloged, and understood by all parties along a supply chain or in a supply web. It can provide the B2B communication standard for both shared data and data definitions. XML also has flexible graphical tools to edit and view businesses objects, as well as transform and share the business objects or data. The application must include an XML parser that can convert an XML document into a Document Object Model (DOM). A DOM is a machine-readable implementation of an XML document. It provides a standard programming interface to allow an application to get and set attributes in an XML document. While XML is not expected to replace EDI in the short term, it offers a more open Internet-based standard.

Contrary to the intent of HTML, XML-formatted data is not usually intended for display, but instead formatted in such a way that it can be easily handled by application programs often referred to as XML processors. Microsoft Internet Explorer 5 can act as an XML processor. The XML standard allows the enterprise to define its own markup languages with emphasis on specific tasks, such as electronic commerce, supply-chain integration, data management, and publishing. For those reasons, XML is rapidly becoming the strategic instrument for defining corporate data across a number of application domains. The properties

of XML markup make it suitable for representing data, concepts, and contexts in an open, platform-, vendor-, and language-neutral manner.

By applying XML technology, one is essentially creating a new markup language. For example, an application of the XML language would produce the likes of an Invoice Markup Language or a Book Layout Markup Language. Each markup language should be specific to its creator's individual needs and goals.

Part of creating a markup language includes defining the elements, attributes, and rules for their use. In the XML language, this information is stored inside of a document type definition (DTD). DTDs may be included within XML documents or the DTD can be external to it. If the DTD is stored externally then the XML document must provide a reference to the DTD. If a document does provide a DTD and the document adheres to the rules specified in the DTD then it is considered valid.

When XML markup is combined with Java technology it becomes significantly easier to build electronic data exchange applications for a couple of reasons. First, the Java platform is Internet-enabled, which immediately facilitates connectivity over TCP/IP between the exchanging parties. In addition, both XML and the Java platform intrinsically support Unicode character sets so both environments enable enterprises to support development of internationalized applications.

A lack of standards is a one of the biggest roadblocks to XML's viability and acceptance. Standards bodies like RosettaNet, BizTalk, ebXML, as well as entities in transportation, travel, health care and other industries are working to define their documents, transactions, transport mechanism, security handling and exception definitions, but no uniform standard was yet accepted.

4.2. Fundamentals – Scientific Research

Along with strong and broad technological progress certain scientific efforts has been undertaken by MIT, IBM and other research centers to support developments of new technology. As an example we can point to the problem of designing multi-item procurement auctions in capacity-constrained environments, in which an optimization-based auction mechanism has been used, relying on the dynamic resolution of a linear program minimizing the buyer's cost under the suppliers' capacity constraints {3].

Interesting work on creating a new XML markup encoding of logic programs called Business Rules Markup Language suitable for interchange between various commercial rule languages [4]. This work deals with the problem how to represent business rules in e-

commerce contracts. The requirements include: declarative semantics as to enable shared understanding and interoperability, prioritized handling so to enable modular updating/revision, ease of parsing, direct execution, and computational tractability. Many other projects can be traced in academic environment.

4.3. Security

Security has become one of the primary concerns when an organization connects its private network to the Internet. CommerceNet 2000 Survey: *Barriers to Electronic Commerce* with more than 80% of the responses coming from outside the United States, primarily from Asia, shows that top barriers were: 1) Security and encryption 2) Trust and risk 3) Lack of qualified personnel.

Security and encryption though still important is less visible if limited to B-to-B respondents.

Enterprises build their security based on physical and logical protection. An Internet firewall is a system or group of systems that enforces a security policy between an organization's network and the Internet. For a firewall to be effective, all traffic to and from the Internet must pass through the firewall, where it can be inspected. All potential points of network attack must be protected with the same level of network security. Setting up an Internet firewall without a comprehensive security policy is like placing a steel door on a tent.

Leading B-to-B solutions offer comprehensive security features as a foundation for industrial-strength B-to-B applications: *Authentication* - by both a user ID and a password, or through the use of an X.509 digital certificate; *Authorization* - by the use of Access Control Lists (ACLs). ACLs define what users (or groups of users) are authorized—or denied—access to a B-to-B service; *Data Privacy* - using the Secure Socket Layer protocol (SSL). This is the standard protocol for providing secure communications over the public Internet.

5. E-Business Enablers

E-Business enablers are companies that provide the products and services that enable electronic commerce. The biggest companies such as IBM, Microsoft, Oracle, Sun Microsystems, and SAP are heavily involved in developing and rendering products and services for e-business. Young companies such as i2Technologies, Ariba, webMethods, CommerceOne, Vignette, Verisign and many others represent the second tier. In many instances these companies are forming alliances with the big ones. Vendors trying to achieve leadership position in a given segment of e-business cover specific virtues of e-business.

5.1. Supply Chain Management

SCM is the planning and control of the flow of goods and services information and money electronically back and forth through the supply chain. The term *supply chain* refers to the network of companies that work together to design, produce, deliver, and service products.

A manufacturer creates a product for a consumer using a supplier's materials and exchanges information with both of them. This simple relationship is repeated on the larger scale of a supply chain as a supplier in turn holds the place of the manufacturer in its own value chain. Figure 4 illustrates some of the entities that can exist in "real-world" supply chains.

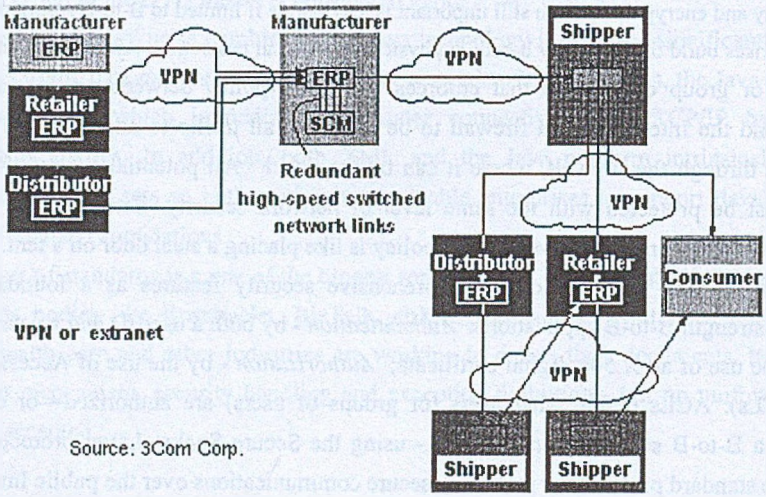


Fig. 4. Supply chain configuration
Rys. 4. Konfiguracja łańcucha dystrybucji

Distributors, retailers and transport providers (such as shipping companies) mediate the value chain between manufacturers and consumers and all parties simultaneously have concerns of both suppliers and consumers. Because participants play multiple roles in the supply/value/ demand chain, supply chain management requires a holistic approach.

Extremely reliable communication channels must be maintained at all times between the SCM application and all data sources and chain participants to ensure data integrity throughout the SCM process. Many SCM vendors are adding Web interfaces to their applications.

Leading SCM software vendor i2 Technologies Inc. offers its TradeMatrix exchange platform including: RHYTHM Suite for demand planning, supply planning, demand fulfillment, and strategic planning; eSource for strategic sourcing; eDesign for design reuse, preferred supplier management, and lifecycle management; Catalog Management for a master catalog of parts and suppliers; Preferred Component Management for managing and promoting preferred part and supplier programs; and eOperate, for decision support related to strategic MRO, also from their partners EXE Technologies' Exceed eFulfillment System, Delano Technology Corp.'s e-Business Interaction Suite, and more.

From smaller companies, Manugistics is best known for NetWORKS™ software, providing provides e-chain capabilities for enterprise collaboration; dealer, distributor, and customer collaboration; supplier collaboration; and carrier collaboration.

5.2. E-Procurement

Workflow technology is a key buy-side component to a procurement solution. It's the technology that allows buyers to specify procurement rules — how orders get routed for approval. Buyers want advanced features like the ability to route orders in parallel to multiple approvers, attach documents, delegate approvals, change the content of orders, and lay out the process graphically.

Ariba's e-procurement product, Ariba Buyer, has powerful workflow, which is part of the reason for its initial success on the buy-side, since it can handle complex procurement rules. Commerce One BuySite has significantly improved its workflow but lacks several of the above features. Oracle's workflow is solid and Web-based as a result of the workflow technology it had to build for its ERP product line. SAP has the advantage of leveraging the workflow technology in R/3, which many companies are already using.

5.3. All-integrated Applications

Two giant companies Oracle and SAP represent offering of what can be described as a complete e-business solutions. Oracle9*i* is a complete software infrastructure for the Internet's next generation of intelligent, collaborative applications. Oracle9*i* includes: Oracle9*i* Database, Oracle9*i* Application Server, and Oracle9*i* Developer Suite. Oracle9*i* Application Server can be used to build dynamic Web sites and applications, create personalized portals, manage and secure Web site infrastructure and more. It is indeed all-in-one e-business suite from enterprise resource planning (ERP) to supply chain management (SCM) and customer relationship management (CRM).

Oracle's rival SAP could be said to be making a similar claim, although in a more modest fashion. The mySAP.com Workplace features an open and flexible infrastructure that consolidates enterprise-wide resources. SAP delivers proven Internet security standards, providing secure single sign-on based on the X.509 certificate standard, secure communication with SSL and Trust Center services to ease deployment and distribution of digital certificates.

WebFlow provides a central point of control for decentralized business processes and delivers the framework for tailored, collaborative business processes. Fully based on XML-enabled Business Objects, WebFlow provides a graphical interface for visualizing and constructing collaborative business processes. Web-Flow can be processed by any target recipient over the Internet and is based on WF-XML- an open XML standard for interaction of workflow systems and applications.

This is a strategic decision that many businesses currently face: choosing an integrated enterprise applications suite, or cut and paste multiple best-of-breed solutions together. But whether or not companies buy packaged enterprise application suites, most are aware that no solution is 100% out-of-the-box.

5.4. Consultants

Some of the more visible integrators in the net market arena include:

- *Computer Sciences Corp,* the most visible, has built 25 marketplaces including VerticalNet, e-STEEL, and CheMatch.
- *Andersen Consulting* built ChemConnect's chemical exchange.
- *PricewaterhouseCoopers* built e.conomy, a cross-industry B2B buying consortium. It's also a consultant on several industry-sponsored exchanges.
- *IBM* operating in alliance with i2 and Ariba provides the full breadth of global consulting, solutions and services

Many others build their consulting teams looking at projected $30 to $130 billion in 2004 to be spent on e-business systems.

6. E-Business Solutions in Practice

6.1. Examples of Working e-Marketplaces

Following are few examples of e-marketplaces already working on the Web.

- www.freemarkets.com - One of the first e-Marketplaces, known for trading direct materials, also idle assets and iInventory. FreeMarkets' technology includes advanced applications and tools including online Request for Quotation (RFQ) creation and publishing, advanced dynamic price formats, and seamless integration with existing ERP/MRP systems. Since 1995, more than $14.0 billion in commerce has been conducted through the FreeMarkets B2B Global Marketplace.
- www.chemconnect.com - The World Chemical Exchange is the world's largest online marketplace for chemicals and plastics. In Q4 2000, the World Chemical Exchange hosted more than $2 billion in annualized raw materials transactions.
- www.e-steel.com - e-STEEL Corporation is a provider of collaborative commerce applications for managing the direct materials supply chain. e-STEEL Exchange, one of the first ten B2B marketplaces to launch, continues to bring buyers and sellers of steel together. The e-STEEL Private Marketplace is a tailored e-commerce site for suppliers of direct materials.
- www.paperexchange.com - PaperExchange, Inc. is a global e-business marketplace for the pulp and paper industry. PaperExchange℠ enables buyers and sellers to negotiate pricing and directly transact with one another through its marketplace. The company provides a 24-hour-a-day e-commerce environment to more than 3,100 corporate members and 4,500 individual members in 80 countries.

6.2. B-to-C e-Marketplace is Ramping up its Technology Structure

One of the best known B-to-C marketplaces **Amazon.com** is attempting to be „the Earth's most customer-centric company" according to its CEO by expanding an IT infrastructure that was straining to support the company's growth and ambitions.

Though Amazon's financial situation is difficult, for the fiscal year ended 12/31/00, revenues were $2.76 billion with net loss increased to $1.41 billion, still Amazon has enough cash (over $ 1 billion) to pump up IT infrastructure using Excelon Corp. for business-to-business integration software and with SAS Institute Inc. for data-analysis applications. The latest purchases include products from E.piphany, Hewlett-Packard, Manugistics, and Oracle.

In early years Amazon was 100% homegrown-engineered. Amazon now is in the process of replacing it with packaged software that is more advanced than Amazon's own stuff, and more advanced than Amazon could hope to build on its own. HP was named as

Amazon.com's primary Internet infrastructure provider, and Manugistics was picked to supply logistics software. Amazon.com also recently began using E.piphany's customer-relationship management platform to ramp up its E-marketing efforts. The company is also using the SAS tools to experiment with the effectiveness of delivering different kinds of content to different customers using SAS Institute's Enterprise Miner data-mining algorithms to detect patterns in customers' online shopping habits.

Amazon.com uses two products from the Manugistics business-logistics software NetWorks E-business suite: NetWorks Strategy and NetWorks Transport, and it is adding Excelon's XML-based business-to-business integration software. A large amount of what Amazon.com sells--except for books--is produced overseas. For shipments bound for both the United States and Europe, NetWorks Transport is used to calculate the actual costs of shipping goods from their country of origin to the Amazon.com location where they will be stored.

This short story is illustrating complexity of problems facing leading B-to-C companies and enormous efforts and costs to become successful.

6.3. Experience from Developing e-STEEL B-to-B Solution

This is explained on an example of e-STEEL Corporation [5], which launched their site in 1999 with the help from Computer Sciences Corp., a consulting company that built the initial site using packaged e-commerce software from BroadVision. They soon recognized that e-Steel had considerable work to do to reposition itself around integration. It was soon determined that the BroadVision e-commerce platform was not scalable enough to support a dynamic trading exchange with hooks into back-end systems. As a result, e-Steel redesigned its architecture and chose BEA Systems' WebLogic transaction framework to replace the BroadVision software. It also sought a partnership with webMethods, which makes hub and spoke software that delivers a secure, dynamic link between the e-Steel exchange and a company's back-end systems—using a wide variety of standards, such as extensible markup language (XML), common delineated files and electronic data interchange (EDI).

The focus now is on integration, or the process of linking an exchange to participating companies' back-end financial, order entry, inventory and manufacturing systems. The goal: to create a highly automated, online supply chain that delivers such efficiencies as reduced transaction costs, less inventory in the pipeline and improved collaboration, forecasting and scheduling among suppliers, suppliers' suppliers and so on.

7. Expectations vs. Reality

Opportunities are huge: sellers reap the rewards of greatly reduced costs of customer acquisition, lower transactions costs, and access to new markets. Buyers benefit from improved efficiencies and an automated ability to comparison shop.

Examined realistically the Internet represents an investment of countless billions of dollars, subsidizing most of the Internet activity. What customers pay for the Internet services does not cover full cost. When customers ultimately do pay these costs it is not clear what they will want. Until that happens corporations are losing their desire to increase their massive Internet investments.

Let's consider some indicators of the current state of B-to-C Internet economy in the USA:

- On-line retail sales represented 0.8% of total retail sales
- Internet advertising is less than 8% of all advertising and rather decreasing.
- Rapidly rising online airline bookings represent only about 9% of all reservations.

Hurdles against rapid increase of B-to-C business are mounting. The Internet is a great giveaway. It is not going away, but it will not drive the economy until if ever it becomes a good business.

B-to-B economy grows faster, forecasts are still optimistic reaching prediction of 6.8 trillion US$ in 2004 what represents little over 8% of total sales for the world.

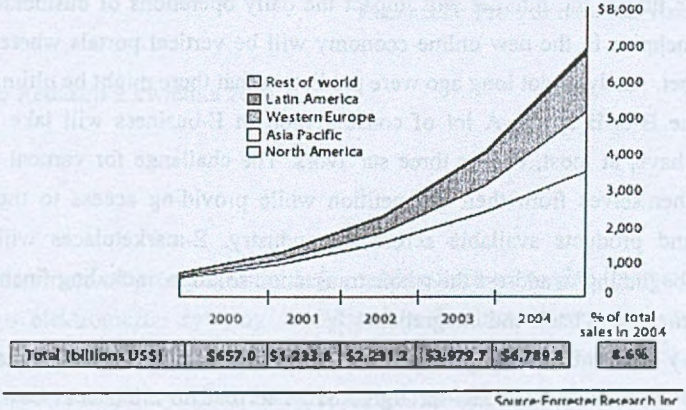


Fig. 5. Forecasted growth of e-business worldwide
Rys. 5. Przewidywany wzrost e-biznesu na świecie

B-to-B e-markets offered access to more suppliers and customers, the potential exchange of virtually all types of information, and the ability to dynamically price goods and services through mechanisms such as auctions and yield management. The development of e-market standards across entire industries offered the possibility of new communities of commerce in which it would be easy to transact with another company.

Large companies developed their own e-market consortia working with other players in their own industries, most notably in the automotive, aerospace, forest products, utilities, food, airline, rail, energy, chemicals, hospitality and computer industries. Independent e-markets are facing competition from e-market consortia, and other inhibiting factors such as:

- Integration
- The difficulty of implementing standards
- The relationships developed with suppliers

Many companies are developing private extranets to facilitate connections with existing partners. These private networks are similar to electronic data interchange connections, but they allow for a much broader range of information types to be transmitted. The private networks do involve the Internet (though in a private form), but they don't involve revolutionary change.

8. Conclusions

In the near future, the Internet will impact the daily operations of businesses large and small. The lynchpins in the new online economy will be vertical portals where buyers and sellers will meet. Analysts not long ago were predicting that there might be ultimately 10,000 verticals in the B-to-B space. A lot of consolidation in E-business will take place. Most verticals will have, at most, two or three survivors. The challenge for vertical portals is to differentiate themselves from their competition while providing access to the breadth of information and products available across the industry. E-marketplaces will be adding functionality, beginning to address the whole transaction solution, including financing, supply chain management, and back-end integration.

Technology standards are a big issue. That's what XML is about. Most technologies can be bought off the shelf or licensed through ASP. The road to e-business however is very bumpy. Business models in B-to-B appear to be more viable than those in B-to-C. Switching costs in B-to-B are much higher because it is much more connected through back-end integration to ERP system.

This environment will lead to the emergence of information networks designed to target customers who are active on a variety of vertical portals. It will be the information networks that will provide the primary channel for vendors. The technology exists, the vision and the relationships to be an important catalyst to the evolution of the online exchange for information.

REFERENCES

1. Benko C., Taylor A.: Through the Portal – Enterprise Transformation for e-Government. Deloitte & Touche, 2000.
2. McLaughlin B., Loukides M.: Java and XML. O'Reilly & Associates; 2000.
3. Gallien J., Wein L.M.: Design and Analysis of a Smart Market for Industrial Procurement. MIT, Cambridge, MA 2000.
4. Grosof B.N, Labrou Y., Chan H.Y.: A Declarative Approach to Business Rules in Contracts: Courteous Logic Programs in XML. IBM Research Center, Yorktown Heights, NY 1999.
5. Stackpole B.: Apps of Steel. CIO Magazine, October 2000.
6. Phillips Ch., Meeker M.: The B2B Internet Report – Collaborative Commerce. Morgan Stanley Dean Witter, April 2000.

Recenzent: Prof. dr hab. inż. Andrzej Grzywak

Wpłynęło do Redakcji 2 kwietnia 2001 r.

Streszczenie

Rozwój Internetu od prostych stron do kompleksowych rozwiązań internetowego biznesu integrującego elektroniczne systemy zarządzania z Internetem prowadzi do radykalnego skrócenia czasu transakcji i redukcji kosztów. Opisano charakterystyki portali i przechodzenie do elektronicznych rynków. Początkowo rozwijał się rynek konsumenta (B-to-C), ale bardziej obiecujący jest biznes między przedsiębiorstwami (B-to-B). Obserwuje się postęp we wprowadzaniu rozwiniętych portali do komunikacji obywateli z instytucjami rządowymi, jak też próby dokonywania transakcji przez portale różnych szczebli aparatu administracyjnego.

Rysuje się też szybki rozwój elektronicznych rynków wąskiej specjalności. Wprowadzenie notacji XML jako instrumentu definiowania danych handlowych stanowi przełomowe dokonanie. Integracja istniejących rozwiązań systemów elektronicznej wymiany informacji (EDI) oraz systemów komputerowego planowania zasobów (ERP) z Internetem dokonuje się już teraz. W zakresie technologii pojawiło się wiele gotowych rozwiązań podsystemów e-biznesu, jak SCM, CRM czy systemów zaopatrzenia. Największe firmy softwarowe, jak Oracle czy SAP, oferują kompletne rozwiązania wraz z prowadzeniem rynków elektronicznych na rzecz klienta. Alternatywą jest złożenie systemu z najlepszych rozwiązań odcinkowych oferowanych przez mniejsze firmy. Opisano przykłady istniejących rynków elektronicznych i problemy ich rozwoju. Wiele niejasności jest wokół finansowej przyszłości e-biznesu. Obawy budzi zabezpieczenie uczestniczących przedsiębiorstw przed atakami intruzów. Mimo wszystkich obaw jasna przyszłość e-biznesu nie jest poddawana w wątpliwość, kwestią jest jedynie tempo jego wzrostu.