BUSINESS-TO-BUSINESS eCOMMERCE OF INFORMATION SYSTEMS: TWO CASES OF ASP-TO-SME eRENTAL

TSIPI HEART

Department of Industrial Engineering and Management
Ben-Gurion University of the Negev, Beer-Sheva 84105, Israel
heart@bgumail.bgu.ac.il

NAVA PLISKIN

Department of Industrial Engineering and Management
Ben-Gurion University of the Negev, Beer-Sheva 84105, Israel
pliskinn@bgumail.bgu.ac.il

ABSTRACT

Enterprises today can "eRent" Information Systems (ISs), through the Internet, from Application Service Providers (ASPs). This emerging IS "eRental" concept is a special case of Business-to-Business eCommerce, where the product is an IS application and the business units engaged in commerce are an enterprise and an ASP. For small or medium-sized enterprises (SMEs), IS eRental might be an appealing solution to complex and costly IT acquisition and implementation. It is yet too early to assess what the future holds for ASP and how far-reaching ASP implications could be for IS delivery and management in the future economy. It is possible however, to focus on and learn from ASP case studies. This paper briefly describes Net-POS and Silverbyte, two Israeli software vendors for the hospitality industry whose members, mostly SMEs, confront with great difficulty the high cost of owning, maintaining, and managing the state-of-the-art IS infrastructure required in the Internet era. These vendors have recently entered the ASP arena by adding an IS eRental option to their for-sale IS offerings. The case studies are followed by a discussion of the new ASP concept as well as of possible directions for research on ASP-to-SME eRental.

Keywords: Application Service Providers (ASPs); eRental; Business-to-Business eCommerce; Small or Medium-sized enterprises (SMEs); Hospitality industry

RÉSUMÉ

Aujourd'hui, les entreprises peuvent « louer en ligne » des systèmes d'information auprès de fournisseurs de services applicatifs (FSA). Ce nouveau concept de « location en ligne » de SI est une forme particulière de commerce électronique interentreprises, où le produit est une application SI et les entités commerciales engagées dans ce commerce sont une entreprise et un FSA. Pour les petites et les moyennes entreprises (PME), la location en ligne de SI peut constituer une solution attrayante comparativement à l'acquisition et à la mise en place de coûteux services de TI. Il est encore trop tôt pour dire ce que l'avenir réserve aux FSA et pour évaluer quel rôle joueront les FSA dans la fourniture et la gestion de SI dans l'économie de demain. Néanmoins on peut déjà examiner des études de cas sur des FSA et en tirer des enseignements utiles. Cet article trace un portrait sommaire de Net-POS et Silverbyte, deux fournisseurs israéliens de logiciels qui oeuvrent dans le secteur du tourisme d'accueil et dont les membres, majoritairement des PME, arrivent difficilement à faire face aux coûts élevés associés à la propriété, à la maintenance et à la gestion de l'infrastructure de TI que doit obligatoirement avoir toute entreprise à l'ère d'Internet. Ces fournisseurs se sont récemment lancés sur le marché des FSA en ajoutant à leurs offres de vente de SI une option de location en ligne de SI. Les études de cas sont suivies d'une analyse de ce nouveau concept de FSA et des horizons possibles de recherche dans le domaine de la location aux PME par les FSA.

Mots-clés : Fournisseurs de services applicatifs (FSA); Location en ligne; Commerce électronique interentreprises; Petite et moyenne entreprise (PME); Tourisme d'accueil

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1. INTRODUCTION

According to Lin & Benjamin (2000), information technologies and information systems (IS) are major contributors to productivity and competitive edge and, in particular, enablers of eCommerce. Their line of thinking continues that of Brynjolfsson (1993) and Brynjolfsson & Hitt (1998) who were among the first to attribute the growth of the American economy during the last decade to massive technology investments and to productive uses of technology. The question is, however, whether the ability of enterprises to use technology productively and competitively depends on size. In this paper we contend that, throughout the history of computing, the effects of enterprise size on the ability of organizations to acquire technology were related to the evolution of the IS renter from the old service bureau to the emerging Application Service Provider (ASP). One possible way for SMEs to overcome the hardships in IT implementation is to use ASPs.

For the last two years, two Israeli Independent Software Vendors (ISVs), Silverbyte and NetPos, who operate in the hospitality industry, are offering their customers an option to rent and host the application on servers located at the vendor's server-farm, instead of buying and installing it locally. Both companies report that many smaller organizations find the idea appealing, and they manage to acquire new customers at a satisfactory rate. In this paper, we will examine these two cases, describing the benefits to the customer organizations. We acknowledge that it is far too early to assess what the future may hold for ASPs and how far-reaching the implications of ASP-to-SME eRental could be for IS delivery and management in the global economy. Yet, it is possible to focus in this paper on lessons that can be learned from two case studies of ASP-to-SME eRental. Further research questions are also derived from the study, and are outlined in the last section of the paper.

Back in the early days of computing, for the most part, only large enterprises could afford to buy and maintain the hardware and software required for IS implementation in-house. However, most Small or Medium-sized Enterprises (SMEs), to avoid the high expense of buying and maintaining an IS infrastructure, resorted to IS rental from service bureaus. By the late eighties, when technology became much more cost effective, following massive decreases in the cost, size, and complexity of computers, SMEs found IS infrastructures more affordable, the demand for IS rental diminished, and most service bureaus had disappeared (Halperin, 2000).

Surprisingly, even though the cost-performance ratio for technology continues to improve, IS rental is once again in demand in the form of IS eRental via the Internet from ASPs, due to growing complexity of IT infrastructure and applications.

This newly emerging concept of commerce is a special case of Business-to-Business eCommerce, where the product is an IS application and the business units engaged in commerce are an enterprise and an ASP. SMEs, much like the situation in earlier days of computing, find it difficult and hardly affordable to own, maintain, and manage around the clock, state-of-the-art IS infrastructures required for competition in the Internet-based global economy. Thus, it was assumed by both market analysts and vendors that SMEs are potential customers of ASPs (IDC 1999, Goldman-Sachs 1999).

Although the exact definition of SMEs varies, there is quite an agreement about the difficulties that SMEs confront: "*Limited people resources. Budgets stretched razor thin. A constant barrage of competitive threats*" (www.sap.com). These limitations make it difficult for SMEs to meet the demands of the new eBusiness era, which require not only automating front-office and back-office functions, under "always-on" operation regime, but also maintaining application integration within the organization and continuous communication of internal applications with external ones. Until very recently, the IS infrastructures of many SMEs revolved around purchased applications residing on different platforms and using separate databases. A survey conducted by the U.S. National Institute of Standards and Technology found that:

> *"Recent studies and focus groups suggest that while small and medium size manufacturing enterprises (SMEs) are investing large amounts of capital in IT consulting services, they're also purchas-*

ing piecemeal applications that are inappropriately scaled for their businesses. To compound the problem, they're not training their staffs appropriately to use the IT solutions in which they've just invested. Many IT hardware and software solutions sit idle, are used inappropriately, or are not used to their maximum advantage". (www.nist.org: "Verification of Information Technology (IT) Solutions for Small and Medium Size Manufacturing Enterprises (SMEs)")

Since, for an eBusiness strategy, well integrated IS infrastructures must be up and running 7 days a week, 24 hours a day, SMEs find their fragmented IS infrastructures too expensive to own and maintain and too complex to manage. It is thus not surprising that ASPs have begun to offer the eRental business concept to SMEs (Goodwin, 2000).

The customers of the ASPs in these two cases are members of the hospitality industry in Israel which, because of their relatively small size and like their counterparts elsewhere in the world, can hardly afford the cost of owning the state-of-the-art IS infrastructure required for eBusiness in the Internet era.

To prepare the background for the case studies, the new IS eRental concept is reviewed, in the next section, and the state of IS in the Israeli hospitality industry is described in the third section, supported by a survey conducted by the authors (Heart et al, 2001).

The fourth and fifth sections contain a brief description of two Israeli software vendors, Net-POS and Silverbyte, that have recently entered the ASP arena by adding an eRental option to their IS offerings. The case details were collected by the authors, through a personal acquaintance with the owners and managers of the vendors. Supportive evidence was gained by visits to customers of Silverbyte and Net-Pos, and by conducting informal interviews and discussions with managers in these organizations.

Finally, the last section contains a discussion of the ASP concept as well as possible research directions on ASP-to-SME eRental in the future.

2. THE NEW IS eRENTAL CONCEPT

The same reasons that had previously led to the emergence of service bureaus have more recently led to the emergence of ASPs as a modern outsourcing concept. A recent report (ASP-news.com, 2000), which describes the forces that are driving the ASP business model, predicts: "Within a few years, **users** will not want to install applications locally. Instead, they will access the applications they need, on demand, from online providers who will charge them by the second for the precise value of the specific features and resources they choose to use." In the context of this paper, **users** are SMEs.

Microsoft, the ultimate "off-the-shelf" "boxed" application vendor, in the framework of its "Dot Net" intentions, has recently announced plans to rent applications off the net. Other vendors in the rather young ASP market of over 1,000 ASPs (Heinlein, 2000), which was pioneered in 1998, include Breakaway Solutions (www.breakaway.com), Corio (www.corio.com), Usinternetworking (www.usi.com), Oracle (www.oracle.com), and EDS (http://www.eds.com/services_offerings/so_os_app_rental.shtml).

According to recent surveys (Brown, 2000; Goering, 2000), ASPs offer a variety of applications including ERP, CRM, project management, data warehousing, and eMail (www.allaboutasp.org). According to IDC (1999), "Worldwide ASP spending will approach $8B in 2004", a 92% compounded annual growth rate. The Yankee Group forecasted in 1999 that the ASP market size would be above $14B by 2004. Thus, a consensus regarding ASP market projections has yet to be reached, but all predictions agree that it is about to be a large market.

ASPs require a broad range of competencies, including skills and expertise from the services, networking, and application worlds. Figure 1 illustrates the various skill sets required by those firms seeking to be an ASP (source: IDC, 1999).

Considering the various skills required for ASP, various players are entering the market, either as "pure players" (like Silverbyte and Net-Pos described later), or as partners of other vendors,

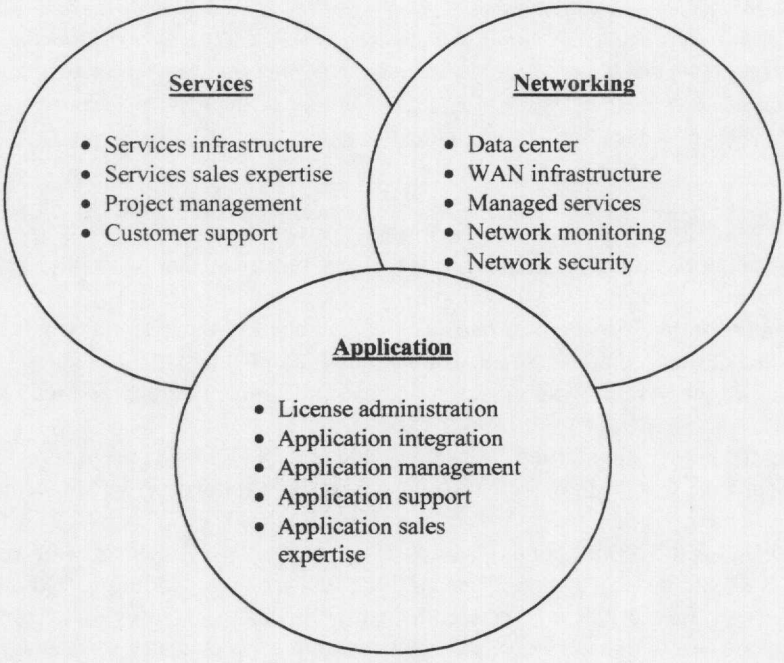

Figure 1: ASP Required Skill Sets

to complement lacking competencies. Thus, in early days, IBM has partnered with IT&T as the supplier of WAN infrastructure and connectivity. Figure 2 describes the various market players (source: IDC, 1999).

The ASP business concept presumes leveraging software across multiple enterprises with hardly any customization. Because of this, larger enterprises might be reluctant to become ASP customers (May, 1999). According to Mateyaschuk (1999), however, lack of software customization may not be such a major limitation of the ASP concept from the perspective of smaller organizations. Some vendors respond to the customization issue by targeting specific industries and/or small market niches. Oracle and Corio target manufacturing and dot-com companies, IBM rents J.D. Edwards and Great Plains ERP packages to consumer-packaged-goods and fabrication-and-assembly industries (IBM Home page), and EDS targets manufacturing and consumer-packaged-good companies. ASPs which offer well targeted applications to small market sectors typically rely on technology that is highly specialized and difficult to duplicate (Heinlein, 2000).

Even though, according to analysts, it looks as if the ASP concept can reduce cost of ownership by between twenty and fifty percent (Wainewright, 2000), doubts still exist about the economical viability of IS eRental. Pandesic, for instance, was formed in 1997 as a joint venture of Intel and SAP and rented SAP's order-management and fulfillment system applications to SMEs (McCabe, 2000). In mid 2000, Pandesic announced that it has shut its Web site down and has ceased taking new customers because its board determined that Pandesic would be unable to turn a profit quickly enough to justify existence. Although reasons for Pandesic's fall have never been discussed in depth, there is good reason to believe that several ASP limitations were acting as impediments to growth. One limitation is the reliance of ASPs on the Internet, which raises questions about response-time and security (Cisco, 1999). Another limitation has to do with the need for application integration. According to Heinlein (2000), ASP customers might prefer providers that offer multiple services based on integrated applications.

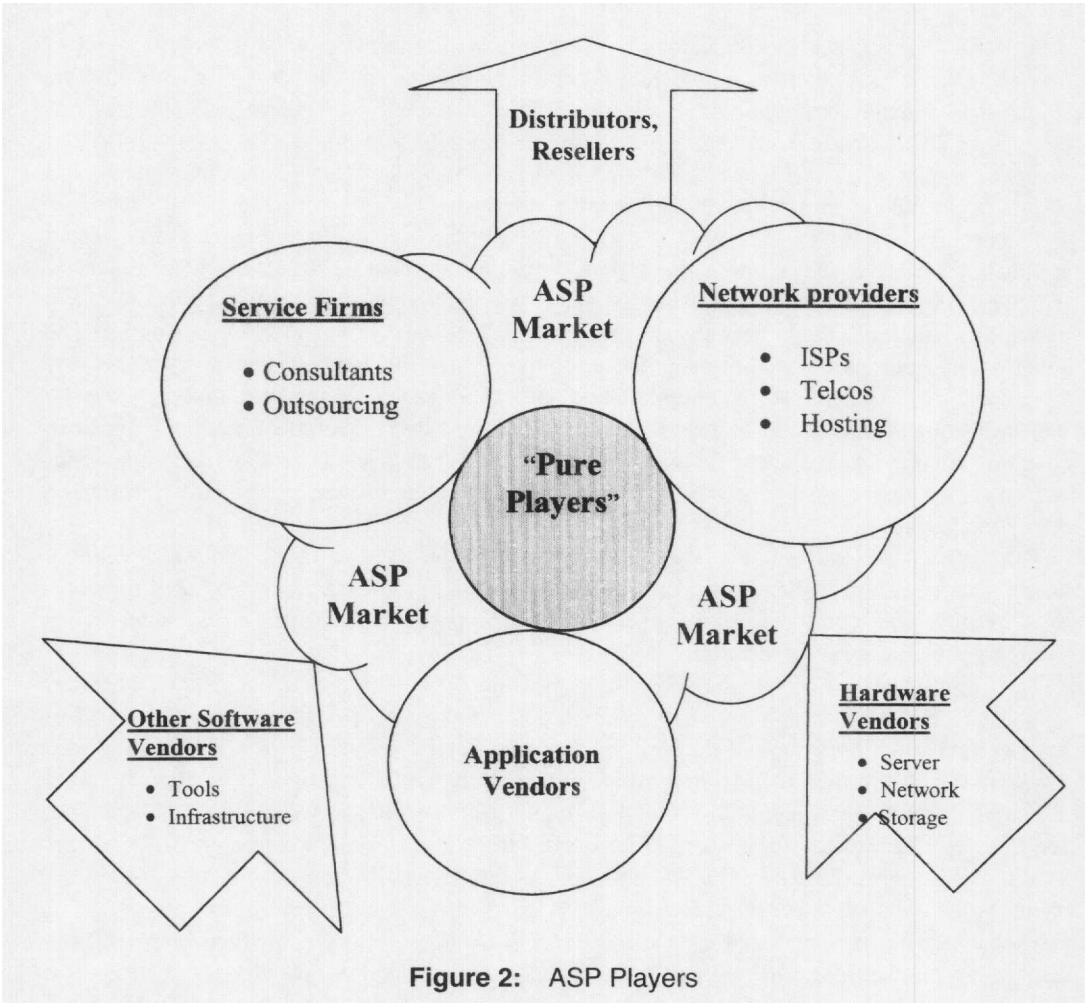

Figure 2: ASP Players

Whether or not ASPs will be a significant factor in the evolving IS landscape remains to be seen. Yet, it is worthwhile considering possible ASP success factors. It may very well be that the ASP business concept might be more attractive to some industries, especially those dominated by SMEs. The hospitality industry, for instance, composed mostly of SMEs can well be defined as such a niche market. The ASP Infogenesis, which offers point-of sale applications to hotels in the US, found that hotel chains "are interested in creating more of an enterprise-view approach to their technology. With the advent of lower-cost connectivity in the form of wide area networks (WANs), hospitality operators are looking to harness the power of an integrated data view where they can access, analyze, and interrelate data from all front- and back-office systems." (Hotels, 2000). The next section reviews a survey of the Israeli hospitality industry (Heart et al., 2001) showing that most hotels, other than the very large ones, can hardly afford advanced applications and are poorly positioned for eBusiness.

3. THE STATE OF IS IN THE ISRAELI HOSPITALITY INDUSTRY

The authors conducted an IS survey in the Israeli Hospitality Industry during 1999–2000 (Heart et al, 2001), funded by the Israeli Ministry of Tourism. More than 300 questionnaires were mailed to all registered Israeli hotels in a comprehensive survey, which followed a preliminary vendor survey, in-depth interviews with hotel-chain managers, and structured interviews in seventy hotels. The research questions were predominantly "*Which IS applications are installed in*

the Hotels? What is the IS contribution to decision-making in the hotels? What are hotel IS needs?" On a 1 to 7 Likert scale, where 1 is low and 7 is high, the survey also tried to find the levels of *IS satisfaction, application integration, and managers' utilization of IS*. The respondents were also asked about *annual expenditure for IS maintenance* and about *IS investment as percentage of total annual revenue*. The questionnaire concluded with an open question, where respondents could explicitly specify needs and wishes.

The preliminary vendor survey indicated that Israeli hotels have limited choice of packaged applications. None of the solutions is comprehensive one, automating both front-office functions (e.g., reservations, reception and cashiering and other directly guest-servicing applications) and back-office functions (e.g., accounting, procurement, and human resource management). The small number of vendors cannot be attributed to the Hebrew language or the small market size since most of the leading software companies, such as Oracle, SAP, or Baan, do business with Israeli customers despite the language and the size of the market. Moreover, ERP vendors have customized their applications to a variety of service industries, such as banking and higher education, yet do not have a solution to fit the needs of the hospitality industry (See the web sites of SAP, Oracle, Baan).

The preliminary structured interviews revealed that, in the absence of one integrated solution, hotels install various applications ("Best of Breed"), sometimes residing on separated file-servers with different operating systems, a situation that imposes extra burden on the hotels when trying to integrate these applications.

The comprehensive survey yielded responses from 59 out of the 303 registered hotels, a response rate of 19%, which is considered high compared to surveys done in the industry elsewhere (Hensdill, 1998). 51% of the respondents were hotel managers, 21% were comptrollers, 7% were CIOs, and the rest held other roles in the hotels. Of the responding hotels, 25% were classified as small (less then 100 rooms), 47% as medium-sized (between 101 to 250 rooms), and 28% as large hotels (more then 250 rooms). This classification is consistent with the one used by US surveys (Hensdill, 1998). Moreover, no significant differences were observed in the results when obtained under different classifications.

The survey has demonstrated a *very high level of IS usage* among the Israeli hotels. Of the responding hotels, 96% used at least one computerized application, usually reservations and front-desk, compared to 87% computerization rate in the US and 77% worldwide (Hensdill 1998). Even hotels with 30–50 rooms were computerized. This result is hardly surprising, considering the high level of technological orientation prevailing in Israel for more than a decade.

The average *level of Satisfaction* was *5.03*, which is above medium on a 1 to 7 scale, and the average *level of integration* was of *4.43*, which is about medium. Since the average for integration was contradicted by responses to the open-question section, where most respondents wished for more integrated applications, it is likely that the question was not well understood. Managers of large Israeli hotel chains interviewed in preliminary in-depth interviews expressed dissatisfaction with "compromise" applications, installed in the absence of better solutions, and with lack of application integration, viewed as an impediment to decision support.

The comprehensive survey also showed that the *annual IS maintenance spending* lies *between $12,000 and $24,000* and that about *1% – 2% of yearly revenue is invested in IS*. A similar level of IS investment was found in US hospitality surveys. It is noteworthy, however, that other industries invest in IS on average 7% (Rubin 1999). This relative low level of IS investment might well be one possible explanation for the lack of interest in the hospitality market by global IS vendors.

The results of the survey have confirmed that hotels are not large enough to afford the expense of deploying and maintaining owned applications. Thus, like other SMEs, hotels are at risk of lagging behind in utilizing IS for eBusiness in the Internet era. Two Israeli vendors, NetPOS and Silverbyte, operating in the Israeli hospitality market, have recently addressed this situation by offering their customers a choice between eRental and sale of applications for hotels

and restaurants. Since the IS needs of the hospitality sector throughout the world are similar, descriptions of these vendors which already function as ASPs for the hospitality industry, in the following two sections, should help shed light on ASP prospects.

4. CASE A: IS eRENTAL FROM NET-POS TO RESTAURANTS

Since 1998, Net-POS (www.net-pos.com) has been selling Point of Sale (POS) software packages for personal computers, predominantly to Israeli restaurants. The second product Net-POS has been selling, since 1999, has been a Restaurant Management System that supports, in addition to the POS function, such restaurant operations as food-inventory management, procurement, and costing. By the end of 1999, eighty organizations, including some major Israeli restaurants, spa properties, and hotel chains, became Net-POS's customers.

When a Net-POS's customer buys an application package from Net-POS, it also acquires robust touch-screen Windows-based client workstations, for the end users, and a robust server, where the application and the database reside, which the workstations are connected to. A network infrastructure, for connecting the client workstations to the server, is also acquired, as are licenses for operating systems, backup utilities, security applications, and database, in addition to the Net-POS software package.

In addition to fixed costs, the server must be regularly maintained, including backup, security handling, and software upgrades, an especially burdensome task since each and every workstation must be upgraded separately. In fact, many Net-POS buying customers have found it necessary to employ IS professionals for handling maintenance and complex upgrades. On top of this, some restaurants have faced technical installation problems as when there was no room for the server and network equipment due to space scarcity. Finally, to reduce system down time to a minimum, Net-POS buying customers acquire expensive service agreements on both the hardware and software sides.

Having sensed disappointment among its buying customers, who began to view owning applications as burdensome, Net-POS has expanded its offerings in early year 2000 to include an eRental option. To a customer, Net-POS today is either an ASP from which application services can be rented or a software vendor from which applications can be bought. Instead of running an application bought from Net-POS on an IS infrastructure owned by the buying restaurant, a renting restaurant runs the same application on an IS infrastructure owned by Net-POS.

An IS eRenter from Net-POS acquires "thin" client workstations, connecting to Net-POS facilities, rather than acquiring, installing, and managing a network of server and "fat" client workstations. Under the IS eRental option, license expenses for operating systems, backup utilities, security applications, and database, for the customer, are greatly reduced, as are maintenance, backup, security handling, and software upgrades. In addition, Net-POS renting customers need neither employ IS professionals, nor sacrifice scarce and expensive space for server and network equipment. The financial burden of service agreements is also greatly reduced.

Already, Net-POS has quite a number of customers and suppliers connected to Net-POS Tender Solution (NTS), another service available from Net-POS to eRental customers an Internet private virtual network. NTS is an eMarketplace for foods and beverages, through which inventory data, purchase orders, and design specifications can be transmitted. NTS contains automatic mechanisms for anonymous tenders, a complete set of Business-to-Business applications, and cost-efficient business inter-networking. NTS. Some Net-POS clients are conducting supply chain management activities via NTS. Currently, because renters are connected to Net-POS servers while buyers are not, only buyers can enjoy the NTS services while buyers cannot.

NTS participants are charged eMarketplace commissions and access fees, which are determined according to the relative size of the connected user and the volume of eMarketplace transactions that are conducted through NTS. In the future, Net-POS hopes to charge customers content subscription and knowledge sharing fees for benefits they may gain from the databases

that contain large repositories for product specifications, product categorization, pricing, availability and demand trends.

NTS creates affordable and efficient distribution channels along the supply chain for customers of food and beverages, on the demand side, and for producers, suppliers, or third-party distributors, on the supply side. Through a standard web browser, a user may request that an automatic, anonymous, and public tender be launched on the NTS network for supply of requested goods. NTS may also launch a 'request for tender' automatically, upon reaching a predetermined inventory level for an item. NTS will then pull together similar tenders to one larger single tender. Due to the larger tender size, vendors might be willing to quote lower prices, enabling small restaurants to enjoy economics of scale usually reserved for larger enterprises.

Each authorized vendor has its own personal database stored on the Net-POS web site, as part of the vendor's 'Virtual Sales Representative', containing vendor identity, relevant categories of products, and the like. Each authorized vendor has access to a powerful eMarketplace platform for receiving and managing online auction tenders and direct orders from connected retailers. Moreover, it is possible for central retailers to display demographic information, types of business, and statistics about tenders or orders. Retailer ratings, based on business criteria, preselecting retailers, and online alerts, are available as well.

Currently, five restaurants have chosen to operate the applications remotely, using Net-Pos as an ASP, including a new global chain, which is now establishing its presence in Israel. Customers express overall satisfaction with performance and cost reduction, and with the simplicity of managing the application and infrastructure. Thus, Net-Pos considers this option a success, since more and more customers present interest in becoming ASP customers.

5. CASE B: IS eRENTAL FROM SILVERBYTE TO HOTELS

Over the past 10 years, the main product that software vendor Silverbyte (www.silverbyte.com) has installed in more than eighty Israeli hotels (about 30% of the market), as well as in a few non-Israeli hotels, was a DOS-based property management application. Since 1998, being the first vendor to launch and sell a Windows-based application suite has given Silverbyte a first-mover competitive advantage in the Israeli market. Silverbyte offers its customers a comprehensive line of solutions for aspects of hotel operations other than property management such as POS management, Spa Scheduling and Management, Guest Services, and Events scheduling. Seamless integration of these products with the front- and back-office systems provides hotels and hotel chains with a comprehensive enterprise wide solution.

In 1999, Silverbyte was asked to rescue a large Israeli hotel chain in ASP mode. A few months prior to that, the chain decided to connect all the members of the chain, using relatively inexpensive "thin" client workstations, via leased-lines, to application and database servers installed in its central office. Because service quality did not live up to its expectations, the chain management asked Silverbyte to take over maintenance of the server-farm under a 7*24 service level agreement.

For more than a year, since early 2000, Silverbyte has been offering the IS eRental option to independent hotels, as well as to hotel chains, under a deployment and financial arrangement customized for each customer. Silverbyte's plan is to expand the choice of applications it eRents to include other useful hotel applications, such as guest service center and spa management, as well as other office and administrative solutions, such as MS-Office applications.

The IS department of most of these chains resisted the ASP concept at first. Silverbyte, sensing resistance, responded with the "Corporate ASP" deployment concept. In this mode, the servers, applications, database, and network are purchased by the hotel chain, located on hotel premises, and maintained centrally by the chain's IS department. One of the chains, to reduce maintenance costs even further, has opted to have its applications and database hosted at a Silverbyte location. More than 60 out of 160 Silverbyte customers in Israel are using Silverbyte products in regular ASP mode and two Israeli chains are using SilverByte products in Corporate ASP mode.

In addition to a one-time subscription fee, Silverbyte is charging its customers per connected workstation. The monthly charge per workstation is a decreasing function of the number of connected workstations or applications used by the hotel. This price includes hardware and software support 7 days a week, 24 hours a day, all year. A small hotel, for example, can purchase one "thin" client workstation and be up and running with Silverbyte's application suite within hours. Thus, the hassle caused by network and server installation is avoided, as is the setup and fine-tuning of the application, which are remotely executed by Silverbyte.

Independent hotels find the IS eRental option appealing than the buying option since the technological support that hotel chains can perhaps afford is beyond their means. The reasonable monthly charge is more appealing to them than the initial purchasing and installation costs required when they choose to buy Silverbyte's application suit. Although the monthly charges are somewhat above monthly charges for buying customers, other expenses are much less compared to owning the equipment and employing full-time support personnel in the hotel.

Following growing demand from its user base and the technological development in the computer and Internet industry, Silverbyte has begun to develop eBusiness tools supportive of a dynamic selling environment on the web. The planned portal technology would enable hotels and their customers, suppliers, and business partners to directly access, navigate and manipulate integrated information using an intuitive interface. Silverbyte plans to be the provider, in ASP mode, of this portal technology that would integrate information from all these entities. For example, potential customers, on the demand side, would be able to connect to hotels, on the supply side, on a vertical Silverbyte eMarketplace, processing each customer's request for hotel reservation. Silverbyte's portal technology should enable hotels to run a more cost-efficient business due to better supply chain management in particular.

Silverbyte is expanding its ASP offerings beyond the Israeli market, having been recently selected by iGroup, a leading Scandinavian Internet company, to establish an ASP platform for the Scandinavian hotel market. In this way, Silverbyte is becoming a solution and technology provider for companies wishing to become hospitality ASPs on the basis of Silverbyte's experience and well-established technology. This joint venture with an Internet provider is adding the communication and connectivity assurance required by all ASP customers.

The transformation of Silverbyte toward becoming an ASP which eRents applications, from the traditional software vendor whose business model was based on a one-time sale, has been gradual. Currently, Silverbyte is looking to form a business partnership with a telecommunication vendor, to enhance the services it can offer to customers, improving reliability, quality, availability, and bandwidth. Silverbyte considers its becoming an ASP a main line of business, already reporting the server-farm, hosting about 80 hotels and 250 workstations, profitable.

6. DISCUSSION OF THE ASP CONCEPT

Both the Net-POS and Silverbyte cases demonstrate an IS eRental model and its eBusiness implications. For instance, the auctioning feature of Net-POS, NTS, facilitates simple, confidential, dynamic, real-time transactions and constant transmission of information between buyers and suppliers. Through NTS, Net-POS offers connected parties, in an industry where gross margins are very thin, reduction in operational costs, cost-efficiencies resulting from aggregation of demand from various independent customers, improvement in supply management processes, and elimination of redundant links along the supply chain. This has significant economic value for determining price and managing inventory. Moreover, aggregation of buying power on the supply side causes vendors to vie amongst themselves in order to gain joint orders. In this way, individual retailers can become part of a large virtual wholesaler, with the benefits of scale for themselves and better prices for their customers. Net-Pos initiative can be considered a success, since its customers are satisfied with the technical, managerial and operational aspect of the Asp solution, and more restaurants show interest in becoming Net-Pos customers.

Silverbyte's approach has been shown to appeal not only to small independent hotels, but to larger Israeli hotel chains as well. In contrast to Net-POS, the initiative to become an ASP did not originate with Silverbyte. Rather, offering application services was initiated at the request of one of its bigger customers wishing to avoid software buying and the heavy investments in initial installation costs, monthly service and upgrade fees, and expensive IS experts. Silverbyte, as opposed to Net-Pos, is already seeing profits from its ASP line of business. The above two case studies present the eRental business model in a positive light, as do promising prospects for the ASP market forecasted by leading consulting and research companies. It is generally agreed, however, that there are some shortcomings and limitations for ASPs still to be overcome (AllaboutASP, 2000).

Security and service level agreement (SLA) uncertainty, as well as lack of understanding ASP, are among the most common reasons for organizations to stay away from the ASP concept (Underwood, 2001).

It is yet to be determined whether, in the future, organizations will be more willing to entrust their most valuable information resource to an external vendor, especially when other organizations have access to the same server farm. The control issue is a problem especially with organizations with an established IS department that is not short of technical personnel. Such organizations are expected to be more reluctant to give up full control over IS implementation and utilization and thus continue to purchase and install applications in-house. The control concern is one of the reasons that the focus of this paper has been on ASP-to-SME eRental rather than on IS eRental to enterprises of all sizes.

Customization imposes yet another ASP limitation. Organizations will either have to give up customization altogether or ASPs will have to find effective and efficient means toward the end of customization that are easy to implement for or by potential customers who, under such circumstances, might find the IS eRental option more appealing.

Another current limitation of ASPs is that the communication infrastructure is usually provided by a third party provider and that the bandwidth, in many cases, is too narrow. Customer organization will stay away from ASPs unless adequate response time and communication reliability can be guaranteed.

Many experts believe that a critical mass of eRental customers is necessary before an ASP can show profits. Until a critical mass of customers is established, most ASPs tend to charge unprofitable rates in order to penetrate the market. Silverbyte hopes to achieve, during 2001, a critical mass of about 200 workstations which is required under the current charging scheme to sustain a profitable server farm, including the required applications, database, communication technology and professional staff. Net-POS, as a player at the restaurant market whose members are smaller than hotels, finds it more difficult to achieve the critical mass, thus having to rely more heavily on profits from its eMarketplace solution.

Whether or not a viable business model can be found has yet to be established. Other Business-to-Business eCommerce pioneers have not fared better so far. They, much like pioneers of ASP-to-SME eRental are seeking other opportunities, such as joint ventures and business partnerships, which will improve prospects for profitability. Some ASPs, for instance, seek partnerships and joint ventures with other vendors (e.g., for communications infrastructure) which might help make the ASP-to-SME eRental business model more sustainable and profitable to vendors, while still attractive to customers.

Given the uncertainty about the eRental business model, there are several questions for researchers to address in the future:

1 How can SMEs cost-effectively take advantage of advanced applications offered by ASPs?
2 Under what circumstances, in terms of size, location, or globalization, should SMEs and larger organizations wishing to become better positioned for the eBusiness era rent applications from ASPs?

3 What is the critical mass of customers that would be required to ensure ASP sustainability and profitability?
4 What charging mechanisms would make ASP-to-SME a win-win proposition?
5 What economical and financial models will prove cost-effective to ASP vendors and customers and would make IS eRental a winning business models?
6 What application portfolio and integration level are required from an ASPs in order to persuade potential customers to switch from being software buyers to eRenters?

Like hotels served in the above two cases, SMEs in other industries might find it more appealing to eRent from ASPs that offer advanced and competitive IS applications at reasonable costs and affordable maintenance efforts. We expect the diffusion of broadband networking, as well as the decline in communication costs in most western countries, to enhance the appeal of the ASP concept to SMEs. Reliable and fast access to advanced applications should open new opportunities for eBsuiness.

Israeli restaurants and hotels, the customer organizations in the above case studies, are service-oriented thin-margined SMEs, whose operations management is quite similar to that of non-Israeli SMEs in industries other than the hospitality industry. Hence, we propose that it is possible to generalize beyond this industry, in one country, to other service and non-service industries, in other countries.

The main lesson to learn from this paper is that the emergence of new models of commerce, given the convergence of information and telecommunications technologies, applies also to the IS field. In the IS case, according to our study, Business-to-Business eCommerce is manifested mainly in the form of ASP-to-SME eRental. For hotels, as well as for other SMEs, the implications of the IS eRental models have yet to be determined. The above cases demonstrated the wide-ranging implications of IS eCommerce on such activities as supply-chain management, distribution, marketing and sales.

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Tsipi Heart Tsipi Heart is a Ph. D. student at the Department of Industrial Engineering and Management of Ben-Gurion University of the Negev in Israel. She has acquired her MBA from Tel-Aviv University. After serving as CIO at a local hotel chain and an international hotel chain operating a number of hotels in Israel, Ms. Heart has worked as a consultant on IT implementation and usage in the hospitality industry. Previous papers of hers have been presented in the 11th Industrial Engineering & Management Conference in Israel (May 2000, Israel) and in the International Conference on Advances in Infrastructure for Electronic Business, Science and Education on the Internet (August 2000, Italy). Her research focuses on IT implementation in small and medium size enterprises, especially hospitality organizations, and application service providers. Her work has been has been published in such journals as Information Technology and Tourism, International Journal of Hospitality Information Technology, Communications of the AIS and Information and Operational Research (INFOR).

Nava Pliskin Professor Nava Pliskin is in charge of the Information Systems (IS) programs at the Department of Industrial Engineering and Management Ben-Gurion University in Israel. Previously she was a Thomas Henry Carroll Ford Foundation Visiting Associate Professor at the Harvard Business School. She acquired her Ph.D. and S.M. degrees from Harvard University. Her research, focused on longitudinal analysis of IS impacts at the global, national, organizational, and individual levels, has been published in such journals as IEEE Transactions on Engineering Management, ACM Transactions on Information Systems, The Information Society, Communications of the ACM, Decision Support Systems, Information & Management, and Database.