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December 2003

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Recommended Citation

Turberg, Stephanie and Nickerson, Robert, "An Assessment of European E-Commerce Systems" (2003). *AMCIS 2003 Proceedings*. 44. <http://aisel.aisnet.org/amcis2003/44>

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AN ASSESSMENT OF EUROPEAN E-COMMERCE SYSTEMS

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Abstract

This paper examines e-commerce systems in three European countries – Germany, France, and Switzerland – in order to identify characteristics of these systems that might contribute to lower utilization of e-commerce in Europe than in the United States. The paper uses an e-commerce system functional model as a framework for assessing the characteristics of the systems. The European systems are compared with each other and with a benchmark e-commerce system in the United States. The paper concludes with recommendations for improving e-commerce systems in Europe.

Keywords: E-commerce, e-commerce assessment, e-commerce in Europe, e-commerce system

Introduction

Although electronic commerce has become a worldwide phenomenon, not all regions of the world have embraced it as fully as others. In the United States e-commerce is widely accepted, but in Europe the movement toward its extensive use is much slower. As a consequence, e-commerce sales in the U.S. far outstrips those of Europe. Hobbey (2001) reports that online revenues in 2000 in the U.S. were US\$488.7 billion compared to US\$87.4 billion in Europe, and that for 2004 they are estimated to be US\$3.2 trillion in the U.S. and less than half that number at US\$1.5 trillion in Europe, where the population is larger than in the United States. Although European markets have been impacted by the e-commerce revolution, they have not yet reached the American standard and are not likely to do so in the near future.

The reasons for the disparity between the American and European adoption of e-commerce are undoubtedly numerous; we could not begin to explore all the reason in this paper. Legal, political, cultural, and technological differences between the United States and Europe, and even among European nations, are likely to contribute to the gap (Turberg 2002). This paper looks at only one factor, the characteristics of the e-commerce systems used by customers, to investigate how it might have an impact on the utilization of e-commerce in Europe.

The purpose of this paper is to assess representative e-commerce systems in three European countries – France, Germany, and Switzerland – in order to uncover characteristics of the systems in these countries that might contribute to lower utilization of e-commerce in Europe than in the United States. Little similar research has been published. One paper by Protogeros (2002) reports on the results of a study of e-commerce company characteristics and online strategies in Europe and North America. Another paper by Asfaw et al. (2001) examines some of the issues European countries face in order to be competitive in e-commerce.

This paper first reviews a model of e-commerce systems that is used as the framework for the assessment. It then summarizes the characteristics of a well-regarded U.S. e-commerce system that is used as a benchmark for comparing the European systems. Next the paper presents the results of the assessment of 42 e-commerce systems in Europe and provides comparative analyses of the systems in the different countries and with the benchmark U.S. system. Finally, the paper gives suggestions for improving e-commerce systems in Europe that might result in increased utilization of e-commerce.

An E-Commerce System Model

Nickerson (2002) proposed an e-commerce system model consisting of eight interrelated functions: product presentation, order entry, electronic payment, order fulfillment, customer service, product support, data acquisition, and data analysis. Figure 1 shows

how these functions interact with each other and with the system users. This model does not include functions, such as inventory control, that are necessary for the full operation of the enterprise because these functions must exist whether or not the organization has an e-commerce system, and thus we consider them to be outside the system. Nevertheless, an e-commerce system interacts with many of these functions.

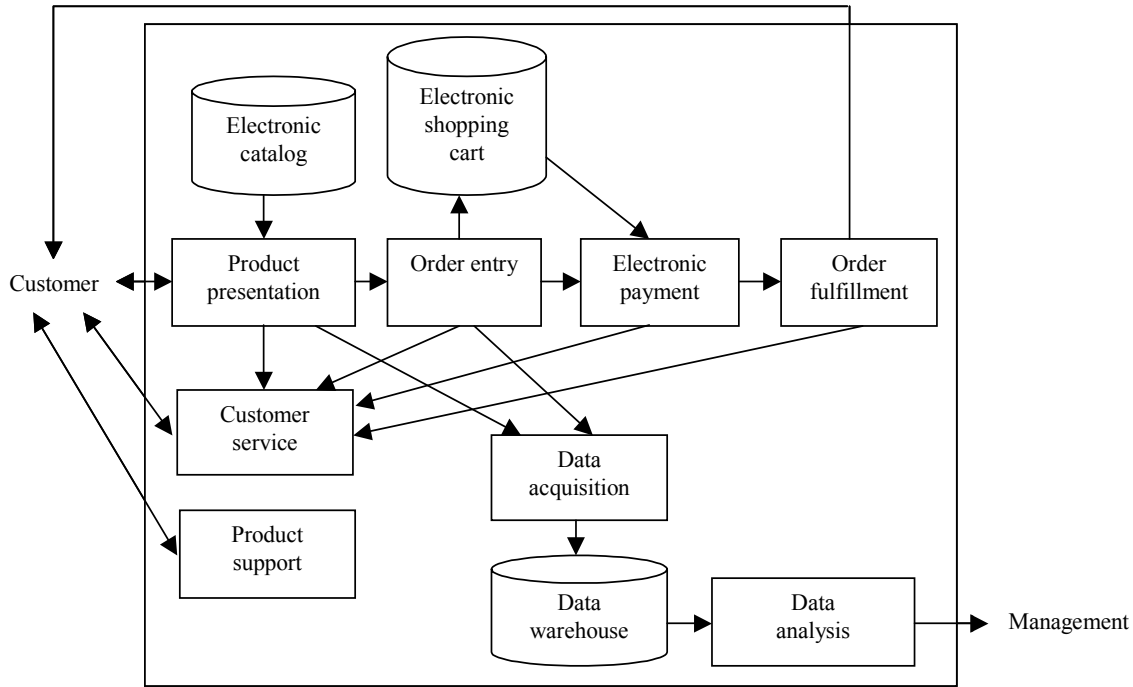


Figure 1. E-Commerce System Model (Nickerson 2002)

The following is a brief explanation of each function in this model:

- *Product presentation.* This function presents information about the product to the customer through the user interface (browser). The information presented can include product descriptions and features; detailed product specifications; product views; and sample product presentations (e.g., music clips, software demos, book chapters). This function can include features such as language selection, product search, and customization for customer preferences. The function is linked to the electronic catalog. It may also be linked to the enterprise's inventory system to ensure integrity between the data in the electronic catalog and the inventory database.
- *Order entry.* This function allows the customer to enter an order for selected products. Information about each product ordered is added to the electronic shopping cart. One characteristic of this function is the effort (e.g., number of mouse clicks) required by the customer to order an item. Another characteristic is the confirmation of inventory availability which can be accomplished by linking the function to the enterprise's inventory system. The function requires access to the enterprise's customer database in order to update and use customer data.
- *Electronic payment.* This function provides the capabilities for the customer to pay for the order and thus complete the transaction. Payment options may include credit card, debit card, gift certificate, check (before delivery), and invoice (after delivery). In B2B transactions, electronic funds transfer (EFT) may be a payment option. As with order entry, a characteristic of this function is the effort required by the customer to complete the transaction. Security is another important characteristics of this function. The function should provide the necessary security through SSL, SET, or some other protocol, and customers should be apprised of the security provisions. This function may be linked to an external payment authorization system. It may also be linked to the enterprise's accounts receivable and other financial accounting systems.
- *Order fulfillment.* This function provides for the delivery of the product to the customer. The delivery can be digital for products such as music, software, and information, but only physical delivery is possible for many products such as apparel,

electronics, and manufacturing components. For physical delivery, the function can allow for the selection of shipping method by the customer. This function is linked to the enterprise's inventory system so that the inventory database can be updated when the order is fulfilled. For physical delivery, the function is linked to the enterprise's warehouse and shipping systems.

- *Customer service.* This function provides assistance to customers who have problems or questions related to the purchasing process. This assistance may be needed before the purchase (e.g., questions occurring during use of the product presentation function, such as product features or use), during the purchase process (e.g., assistance with the use of the order entry and electronic payment functions), or after the purchase (e.g., questions about order fulfillment such as order tracking; questions about exchange or return). Options for providing customer service include toll-free telephone number, e-mail, chat, and FAQs.
- *Product support.* This function provides assistance to the customer related to the product after it has been received. This support may include initial set-up and installation, regular operation, troubleshooting, on-going maintenance, and warranty or non-warranty repair or replacement. The options for providing product support are the same as those for providing customer service. The function is separate, however, because the information about the product provided by the product support function is more specific than that provided by the customer service function. This function may be linked to a product information database.
- *Data acquisition.* This function captures data during the customer interaction with the system. Some of the acquired data, such as customer identification and credit data, is stored in the enterprise's customer database. Much of the acquired data, however, is stored in a separate data warehouse. This data includes customer preferences and purchasing decisions. While using the product presentation function, a customer could explicitly indicate his/her preferences by entering them into the system, or the system could track the customer's product searches to identify preferences. Customer purchasing decisions would be acquired from the order entry function when a customer places an order for specific products. The data acquired by this function would typically be used for marketing research purposes. Customer privacy should be guaranteed when data is acquired. The customer should be informed of this guarantee, which can be handled by an explicit privacy statement.
- *Data analysis.* This function analyzes the data in the data warehouse. Data mining techniques are typically used for this purpose in an effort to identify trends, relationships, and other useful information. The results of the analysis can be used by management for decision making in many areas, especially marketing.

A Benchmark E-Commerce System

As a benchmark for comparison of the European e-commerce systems examined later in this paper, this section provides a brief overview of the e-commerce system at Lands' End, Inc., a U.S.-based mail order company that sells "traditionally styled clothing for the family, soft luggage, and products for the home" (Lands' End 2002). In fiscal 2001, Lands' End's online sales were US\$218 million or 16.1% of its total sales (Lands' End 2001). By a benchmark we mean a high quality e-commerce system against which other e-commerce systems can be compared, not a typical or "average" e-commerce system. Although other e-commerce systems could have been selected to serve as the benchmark, the Lands' End system (www.landsend.com) was chosen because it is generally well regarded and has received a number of accolades (for example, Rosencrance 2000). More details of the assessment presented here can be found in Nickerson (2002).

The following is an examination of the functions of the Lands' End e-commerce system using the e-commerce system model described previously. The information provided was acquired from a detailed inspection of the Lands' End e-commerce web site and from literature provided by the company. The details of some functions are incomplete because it was not possible to find information about them from the available sources.

- *Product presentation.* Lands' End advertises its products on its web site by providing inviting descriptions and giving details such as the type of fabric used and the product construction. Each product is shown in a photograph of the item or often, for apparel, of a live model wearing the item. Color options are also shown in images. One feature, My Virtual Model™, provides the customer with a three-dimensional image of his or her body based on measurements given to the system by the customer. The customer can try different clothing items on the image to see how they might appear on him or her, and can rotate the image through 360 degrees to view the clothing on the image from different sides. The Lands' End system allows the customer to select a language (Japanese, German, French, Italian) by clicking on a country-specific site from among those available. The system includes a search tool for locating products. The system also includes a customization feature, called

My Personal Shopper, that allows the customer to specify personal preferences from which the system can recommend products to the customer.

- *Order entry.* Two clicks are required to order an item, one to select the item and one to add it to the customer's electronic shopping cart. Inventory availability information is provided by the list of available sizes and colors on the product information page.
- *Electronic payment.* Payment options available are credit card and previously purchased gift certificate. Security is provided through SSL, and an explanation of the security is available from most pages. Four clicks are required to complete the transaction.
- *Order fulfillment.* Different shipping methods are available with varying times and costs for shipment, and worldwide shipping is provided. The shipping charge is added to the purchase total based on the customer-selected shipping method.
- *Customer service.* Customer's can contact Lands' End before, during, or after an order is placed in a number of ways including by e-mail, by a toll-free telephone number, by fax, and by postal mail. In addition, the customer can fill out a brief online form with name and phone number, and a Lands' End representative will telephone the customer soon afterward. Another feature allows the customer to ask questions of a representative through online chat. An online order tracking capability is provided with which the customer can check the status of his or her order at any time.
- *Product support.* Because of the nature of the product, little after-sales product support is needed. One common support question, how to launder or clean an item, is included with the other product description information. If necessary, a customer can contact Lands' End for product support through any of the options available for customer service.
- *Data acquisition.* Certain data is collected from a customer who places an order, including name, address, telephone number, e-mail address, credit card information, and product-ordered details (item, color, size). If a customer uses the My Virtual Model feature, body dimensions and other personal features are also acquired. If a customer uses the My Personal Shopper feature, personal preference information is explicitly gathered. A privacy statement explaining the use Lands' End makes of the data it acquires is available from most pages.
- *Data analysis.* The only data analysis explicitly stated is analysis of site traffic patterns; no information on other forms of data analysis is available. We can speculate, however, that other data analysis is done, including analysis of customer demographic data (age, sex, location, etc.) and customer product preference data (item, size, color, etc.) with appropriate correlation analysis.

Assessment of E-Commerce Systems in Europe

In order to evaluate e-commerce in Europe, a sample of B2C e-commerce systems in Germany, France, and Switzerland were assessed using the e-commerce system model. Two assessments were made, one in October/November 2001 for 43 e-commerce systems and one in January 2003 for all the previous systems except one that was no longer operational. The e-commerce systems were selected from the five most popular categories for online shopping according to Ernst & Young (2001). The categories are CDs/music, books, clothing, travel, and electronics.

The e-commerce systems were selected after identifying candidates through queries of popular search engines. Efforts were made to choose well-known European companies and popular web sites within Europe. The e-commerce systems were distributed roughly evenly among countries and categories as shown in Table 1. A spreadsheet survey form with 52 items was developed based on characteristics of the eight functions in the e-commerce system model. Finally, the web sites of the e-commerce systems were assessed and recorded using the survey form.

This section presents analyses of the results of the 2003 assessment of the European e-commerce systems. Where appropriate it provides comparisons with the 2001 assessment. Although 52 items were evaluated for each web site, this section only presents the analysis of selected items from six of the e-commerce system model functions. These items are presented because they provide the basis for recommendations given later in this paper. Analysis of other items for all functions from the 2001 assessment can be found in Turberg (2002).

Table 1. E-Commerce Systems by Country and Category (2003 Assessment)

		Country			
		Germany	France	Switzerland	Total
Category	CDs/Music	2	3	3	8
	Books	3	3	2	8
	Clothing	3	3	3	9
	Travel	3	3	3	9
	Electronics	2	3	3	8
Total		13	15	14	42

This section also compares the results from the assessment of the European systems with the characteristics of the benchmark Lands' End system. Although use of the Lands' End system for comparison may not be "fair" because it does not represent an "average" e-commerce system in the United States, it does provide a high standard against which the European systems (as well as systems in other countries including the U. S.) can be evaluated. A comparison with a group of U.S.-based e-commerce systems selected in a way similar to the selection of the European systems could be valuable, but such a comparison is outside the scope of this study. It is, however, planned for future research.

Product Presentation: Languages Available

Because of the diversity of languages in Europe, the product presentation function of an e-commerce system designed to sell products across Europe should present its products in several European languages, including German, French, Italian, and English. Table 2 lists the percent of the e-commerce systems that made product presentation available in each of these languages. Table 3 shows the percent of systems with the indicated number of languages available for customer selection. Finally, Figure 3 shows the distribution of languages available by country. Few significant differences were found between the 2001 and 2003 assessments although the availability of Italian in German and French systems increased and some systems are offering more languages.

Table 2. Languages Available

Language	Percent systems with language available
French	79%
German	69%
English	29%
Italian	24%
Other	21%

Table 3. Number of Languages Available

Number of languages available	Percent systems
1	40%
2	23%
3	14%
4	14%
5+	7%

By way of comparison, the benchmark e-commerce system at Lands' End provides sites in English, Japanese, French, German, and Italian. In addition, it has country-specific sites in English for the U.K. and Ireland.

Order Entry: Inventory Confirmation

One characteristic of the order entry function of e-commerce systems is confirmation of inventory availability when the customer places an order. Without such confirmation, the customer is not sure whether he or she will receive the product in a timely fashion or even at all. The 2001 assessment showed that only 48% of the e-commerce systems provided such confirmation with Germany and France taking the lead at 54% and 53% respectively and Switzerland lagging behind at 36%. The 2003 assessment, however, showed a dramatic shift with 93% of the systems now confirming inventory availability at order entry. All systems in Germany and France provide inventory confirmation, but Switzerland still trails at 79%.

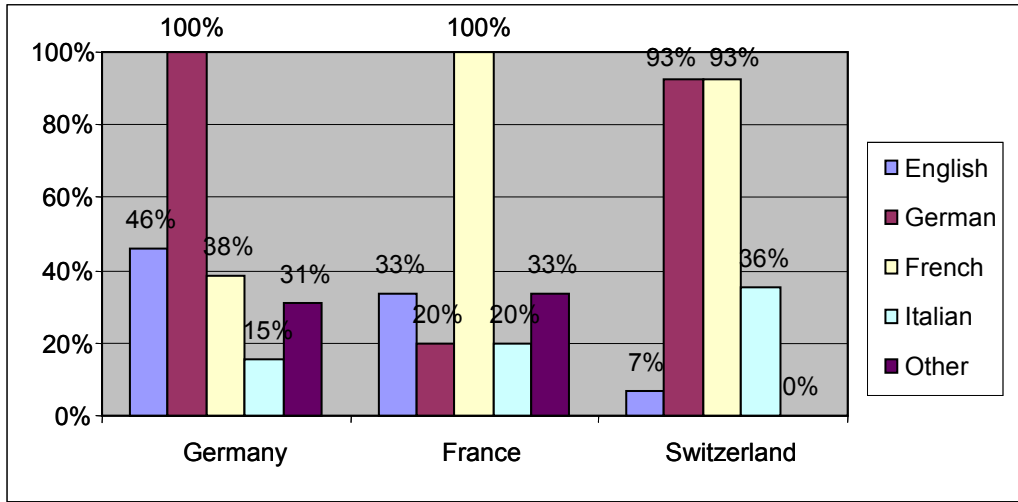


Figure 2. Distribution of Languages Available by Country

The benchmark e-commerce system at Lands’ End provides inventory confirmation before the customer places an order by listing only the colors and sizes that are available for an item on the product description screen. Thus the customer does not have to proceed to order entry to know if the item is available.

Electronic Payment: Payment Methods and Security

Payment methods provided by the electronic payment function of an e-commerce system should make customer payment easy and secure. Table 4 shows the percent of the e-commerce systems that provide each of the listed payment methods. Figure 3 gives the distribution of the payment methods available by country. Some differences were found between the 2001 and 2003 assessments including an overall drop in the availability of online payment, although the availability of this method increased in Germany.

Table 4. Payment Methods Available

Payment method	Percent systems with method available
Online (credit/debit card)	64%
COD (collect on delivery)	21%
Check	19%
Invoice	48%
Other	19%

Payment needs to be secured by an appropriate method such as SSL or SET. Only 73% of the e-commerce systems, however, provided secure payment (up from 65% in the 2001 assessment). Figure 4 shows the availability of secure payment by country. The principal difference between the 2001 and 2003 assessments is that more systems in Switzerland now provide secure payment.

The benchmark e-commerce system at Lands’ End provides two forms of payment: online (credit card) and prepurchased gift certificate. To secure payment, the system uses SSL.

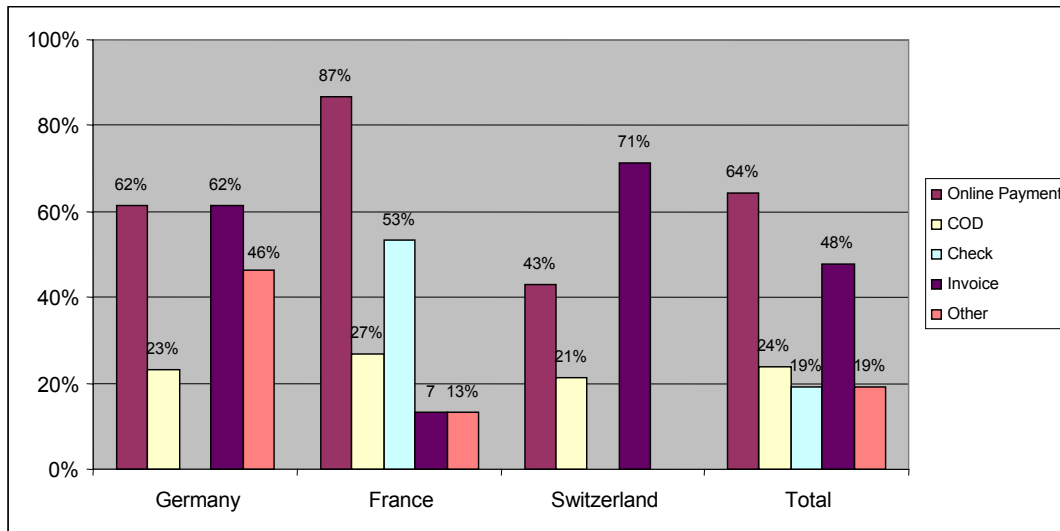


Figure 3. Distribution of Payment Methods Available by Country

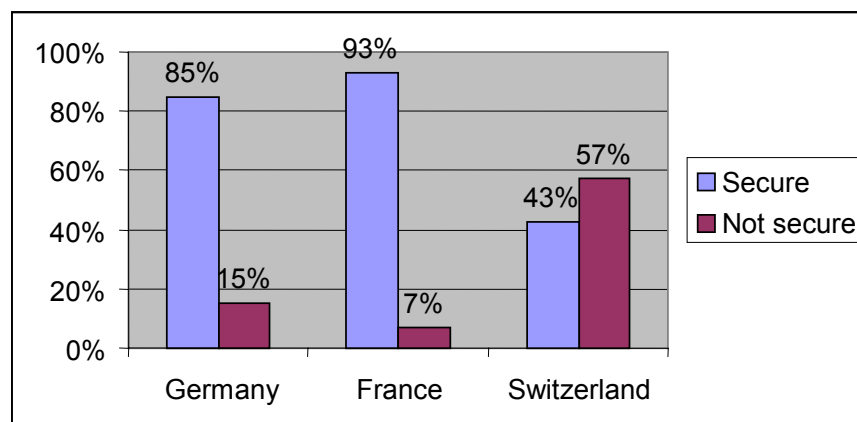


Figure 4. Availability of Secure Payment by Country

Order Fulfillment: Shipping

An e-commerce system that provides for shipment of goods outside its own territory in its order fulfillment function indicates a commitment to the online business model. Assessment of the e-commerce systems showed that 44% shipped only within their home country (42% in the 2001 assessment), 17% shipped only within Europe (26% in 2001), and 39% shipped worldwide (33% in 2001). Figure 5 shows the distribution of shipping destinations available for the e-commerce systems in each country. Between the 2001 and 2003 assessments there was an increase in the availability of worldwide shipment in Germany and France but an elimination of such shipment among the e-commerce systems studied in Switzerland.

The benchmark Lands’ End e-commerce system provides worldwide shipment with the shipping method, and thus the speed and cost of shipment, selectable by the customer.

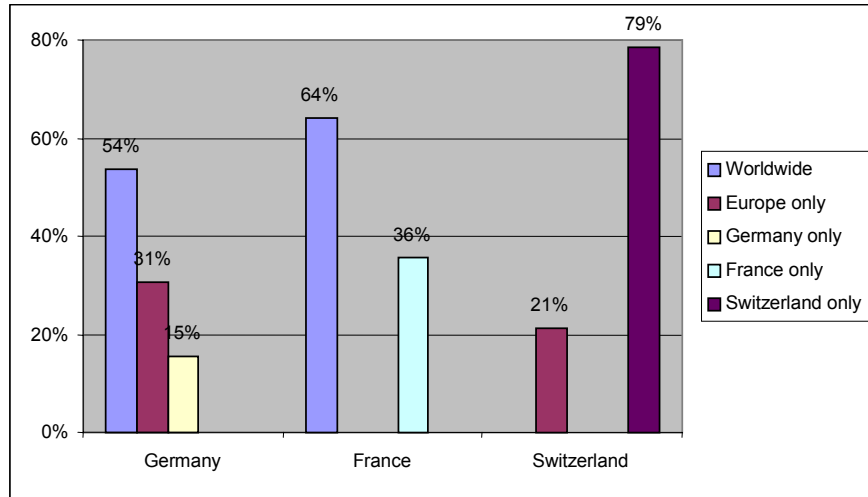


Figure 5. Distribution of Shipping Destinations Available by Country

Customer Service: Contact Options

For international customers the ability to have questions answered easily by the customer service function provides reassurance when using an e-commerce system. Table 5 shows the percent of the e-commerce systems that provide each of the listed options for customer service contact. The principal differences between the 2001 and 2003 assessments was an increase in the availability of feedback forms and FAQs.

Table 5. Customer Service Contact Options Available

Contact option	Percent systems with option available
E-mail	100%
Phone	93%
FAQs	83%
Feedback form	67%
Chat	2%

By way of comparison, the benchmark e-commerce system at Lands’ End provides a variety of contact options for customer service. Customers can use e-mail, a toll-free telephone number (within the United States and Canada), a toll-charged telephone number (outside the United States and Canada), fax, postal mail, online chat, and service representative callback to get answers to their service questions.

Data Acquisition: Privacy Policy

A privacy policy is important in the data acquisition function to assure e-commerce customers that the information they give or that is acquired by the system will be used in acceptable ways. Among the e-commerce systems, 78% have a privacy policy, a substantial increase over the 2001 assessment in which 63% had a privacy policy. The most dramatic increase in the availability of a privacy policy was in Switzerland, which went for 21% in the 2001 assessment to 64% in 2003.

The Lands’ End e-commerce system has an extensive privacy policy that explains in detail the information that is acquired from the customer and how it is used by the company.

Recommendations for Improving European E-Commerce Systems

The preceding analysis of e-commerce systems in Europe and comparison with the benchmark U.S. e-commerce system leads to several recommendations for improving European e-commerce systems. The purpose of these recommendations is to make the use of the European e-commerce systems more attractive to worldwide customers in general and to pan-European customers in particular. In so doing, the utilization of e-commerce in Europe may increase more rapidly than in the past.

Recommendation 1. Product presentation and other functions with which customers interact should be provided in multiple European languages and in English. Currently 40% of the e-commerce systems studied are available in only one language and only 29% of those that have multiple languages available include English as a choice. In order to sell across Europe, an e-commerce system should be available in major European languages including German, French, Italian, and Spanish. With the increased importance of Eastern European countries in the European Union, languages of these countries (such as Polish and Czech) should be available. In addition, English should be available for all e-commerce systems because it has become the *de facto* international standard language of business. If sales in Asian countries is anticipated, then appropriate Asian languages, such as Japanese and Chinese, should be available.

Recommendation 2. All e-commerce systems should confirm inventory availability at the time an order is placed. Although there has been a significant increase in inventory confirmation in the e-commerce systems studied between the 2001 to 2003 assessments, this trend should be accelerated until all systems in all countries have this feature. Customers, especially those in countries other than the home country of the company offering the product, need to know immediately if their order can be fulfilled. Customers will not be satisfied with waiting until a letter is received, especially if they are located some distance from the company's home country.

Recommendation 3. Credit/debit card online payment should be accepted. Credit/debit card payment is widely used throughout Europe, in the United States, and in the rest of the world. Still, only 64% of the e-commerce systems studied accept this form of payment. In order to attract customers from around Europe and from other parts of the world, especially North America, this form of payment must be available.

Recommendation 4. Payment should be secured through a widely accepted method such as SSL or SET. Only 73% of the e-commerce systems studied provide secure payment. In order for customers to feel secure about using online payment, a secure system should be provided and full information about the security being used should be available to the customer. Customers, especially those from outside the home country of the company, may be reluctant to use an e-commerce system without full assurance that their payment information is secure.

Recommendation 5. Worldwide, or at least European, shipment should be provided. Currently only 39% of the e-commerce systems studied provide worldwide shipment and another 17% provide shipment throughout Europe. However, 44% of the systems only provide shipment within their home country. In order to increase the utilization of their e-commerce systems, companies should provide shipment of their products to countries other than their own.

Recommendation 6. Multiple easy-to-use and cost-free methods to obtain customer service from around the world, or at least from within Europe, should be provided. In general, the e-commerce systems studied provide several customer service contact methods, with 93% having three or four options. Customers in different countries will have different expectations for customer service contact. Additional options should be added so that customers from countries other than the home country of the company will be able to contact the company easily and inexpensively. (The benchmark e-commerce system at Lands' End, although providing more methods for customer contact than the European systems, could be improved by accepting collect customer service calls from outside the United States and Canada.)

Recommendation 7. Customer privacy policies should be fully explained to the customer. Although 78% of the e-commerce systems studied have a privacy policy available for customers to read, all systems should have such a policy. Customers in other countries are not likely to know the privacy laws within the home country of the company and therefore they should be assured that their personal information will be handled in an acceptable way. All e-commerce systems should provide a readily available privacy policy.

Conclusion

This paper has presented the results of an assessment of a sample of e-commerce systems in Germany, France, and Switzerland in order to determine how certain characteristics of these systems might be improved in an effort to encourage the utilization of e-commerce in Europe. As shown in the analyses of different functions of the European e-commerce systems, there are a number of differences among the systems studied in Germany, France, and Switzerland, and between the European systems and the benchmark e-commerce system of Lands' End. The analyses also show that there has been some improvement in these systems between the 2001 and 2003 assessments. The recommendations provided in the paper may help further improve the European systems in a way that might encourage their increased utilization throughout Europe and the rest of the world.

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