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Harri Oinas-Kukkonen
University of Oulu

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Web-based Electronic Commerce by 250 Largest Finnish Companies at Autumn 1998

Harri Oinas-Kukkonen
University of Oulu
Department of Information Processing Science
P.O. Box 3000, FIN-90014 Oulu, Finland
Harri.Oinas-Kukkonen@oulu.fi
<http://www.hytec.oulu.fi>

Abstract

This paper seeks information about how organisations are using the Web to interact with consumers. A survey of the Web sites of 250 largest Finnish companies was conducted at the autumn 1998. It was found out that three companies out of four maintain a public Web site, and higher revenue companies are more likely to be present on the Web. Navigational features were found to be the most neglected area, even though these actually provide many of the Web's benefits. Only one-fourth of the companies provide graphical overviews to product information or the site, and even less provide search facilities or guided tours. It was also found out that the U.S. companies are much more eager to sell and provide customer service through the Web. The findings suggest that support for contemporary hypermedia in Web information systems remains very limited.

Keywords: electronic commerce, Web-based information systems, Web-based services, user interface, navigation.

1. Introduction

Electronic commerce has taken place between organisations for several years through electronic data interchange systems. Recently, the World Wide Web has become the primary driving force for electronic commerce and many companies have rushed to the Web. Still, relatively little is actually known about how organisations are using the Web to interact with consumers and vice versa. This consumer-centred perspective enables new forms of relationship marketing and provides a direct linkage between the target customers' roles and the firm. It is the potential of this kind of interactivity, which makes the Web highly attractive for businesses. This approach can also be utilised for business-to-business applications, because end-users of these applications behave to some extent in a similar fashion to individual consumers.

This paper seeks information about large businesses' use of the Web for electronic commerce by studying the Web sites of the 250 largest Finnish companies (by revenue). Finland provides an interesting platform for surveying this, because the number of Internet connections per capita and the overall level of information technology utilisation is relatively high. The research question for this paper can be described as: *What Web-based services do the large businesses provide for consumers?* First, this paper briefly reviews the conceptual realm of Web-based electronic marketing and commerce. Second, it describes results from a survey tackling the research question. Third, the paper suggests future research and design issues for the development of Web-based information systems for electronic commerce.

2. Literature review

Applegate et al. (1996) describes a general, technical framework for research on electronic commerce. Their framework consists of five levels and two means of overall support. These levels are from bottom-up as follows: information superhighway infrastructure (e.g. the Internet), multimedia content and network publishing infrastructure (e.g. the Web), messaging and information distribution infrastructure (e.g. HTTP and email), common business services infrastructure (e.g. security and payment systems), and electronic commerce applications (e.g. home shopping). The two overall support activities include technical standards for electronic commerce documents and multimedia and network protocols, as well as public, policy, legal and privacy issues.

Zwass (1996) describes electronic commerce as consisting of three meta-levels: technological infrastructure (e.g. the Internet and the Web), business infrastructure (e.g. secure messaging and services or enablers of interpersonal communication and commerce), and electronic commerce applications. He also defines three orientations to electronic commerce applications. These are consumer-oriented commerce, business-to-business oriented commerce and intra-organisational business.

Wigand (1997) describes five main approaches through which one may view electronic commerce. These are transaction cost theory, marketing, innovation diffusion, information retrieval and strategic networking. Within the marketing approach, Wigand (1997) defines three sub-approaches, namely customer, product and profit approaches. A sub-approach relates here to an attitude and a pattern of conduct, and the extent to which a firm tries to determine what its customers want and then gives them what they want.

Lederer et al. (1997) found out in their survey that organisations implement electronic commerce to support differentiation or focus strategies rather than cost leadership (these are the three main strategies for businesses). They also report that organisations seek benefits associated with increased competitiveness and better information, and that increased competitiveness predicts differentiation and focus strategies.

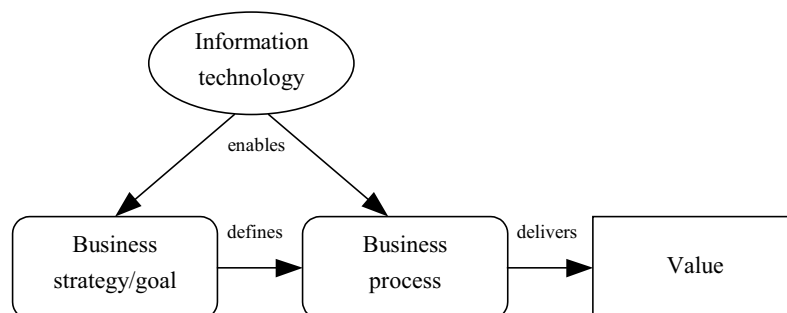


Fig. 1. The added value of technological innovations.

The adding of value occurs only when optimal relationships among information technology, business strategies, goals, and processes have been developed and adopted into use, (Wigand, 1997). See Fig. 1. The role of technological innovations becomes valuable only through enabling such business processes, which are defined by the business strategies and goals.

3. Results

The survey conducted involves a content/service analysis of the Web sites of the 250 largest Finnish companies. The sites were located by searching for generic names (www.company.com, www.company.fi, www.companygroup.com, www.companygroup.fi), or by using search engines or lists of domain names. The data was collected and validated between September 7 and September 20, 1998.

A total of 191 companies were found on the Web, which means that 76,4% of the companies conducted commercial Web-based activities with consumers. On the other hand, one-fourth of the companies had not set up a Web site of their own yet. The companies were divided into three exclusive categories based on revenues in the previous year: above 1 billion EURO (1 EURO=5,94 Finnish marks), above 1 billion FIM (but below 1 billion EURO), and below 1 billion FIM. Twenty-eight of the companies whose revenue was more than 1 billion EURO, 89 of the companies whose revenue was more than 1 billion Finnish mark, and 74 of the companies whose revenue was less than 1 billion Finnish mark provided Web commerce facilities. Figure 2 shows the percentages of Web presence by revenue. This reveals that higher revenue companies are more likely to be present on the Web, and the Chi-square test for independence supports the conclusion (Chi-square value = 16,477, p-value = 0,002).

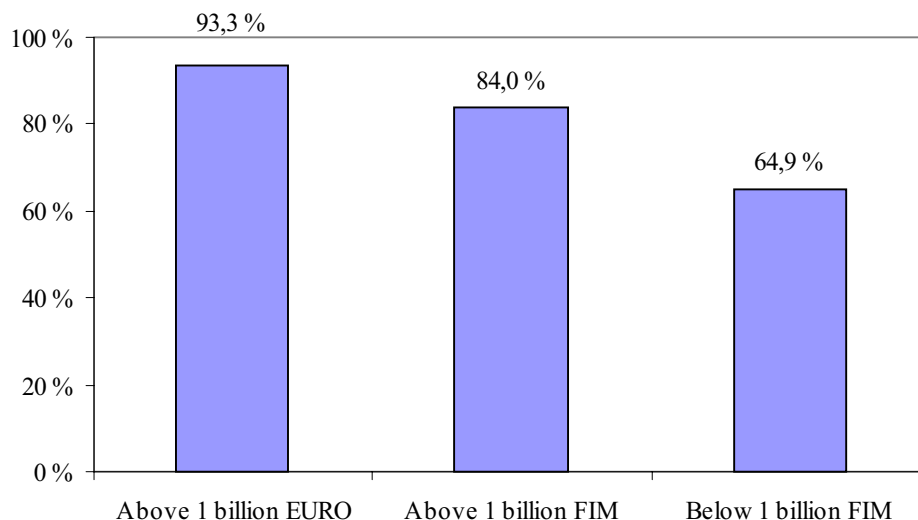


Fig. 2. Company Web presence by revenue.

Further content and service analysis was limited to the 153 companies whose Web site located in Finland. The remaining 38 companies either had their web presence on a foreign site or on the site of one of its daughter companies, or the site was unaccessible due to its being an intranet solution or due to the pages being public but under construction at the time of visit. Figures 3-6 show the percentage distribution of the main content and service categories.

3.1. General features

Company overviews or descriptions were offered on 88,9% of the sites (see Fig. 3), whereof about half (52,2 %) described the company in a detailed manner. An index or directory to different locations of the company was offered on 73,9% of the sites, out of which about one-

fourth (27,4 %) offered also geographical maps for these locations. Financial facts were provided by 55,6%, and a message from the CEO by 11,1% of the companies.

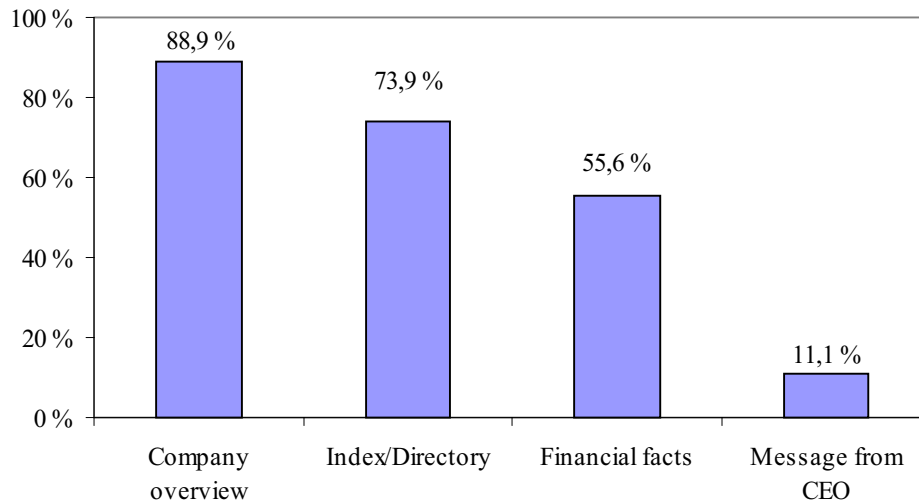


Fig. 3. General features.

3.2. Presentation features

In our survey, 90,8% of the sites displayed some product/service information (see Fig. 4). However, when taking a deeper look at these, it was found out that only a little more than half of the companies (56,8%) gave detailed information about products or services, or covered their set of products thoroughly, while essential information was lacking with the remaining companies. Also presenting the products was often simple text-based information, and none of the companies provided a chance to try out products through virtual reality experiences, for instance. "What's new" information was displayed on 71,2% of the sites, including e.g. news releases or introductions to hot topics or new products. Links to other sites were provided on 25,5% of the sites. Among these, more than one third of the companies (38,5%) only had links to their partner companies' sites, while the rest also had some links to related services or pages discussing their field/domain on a more general level.

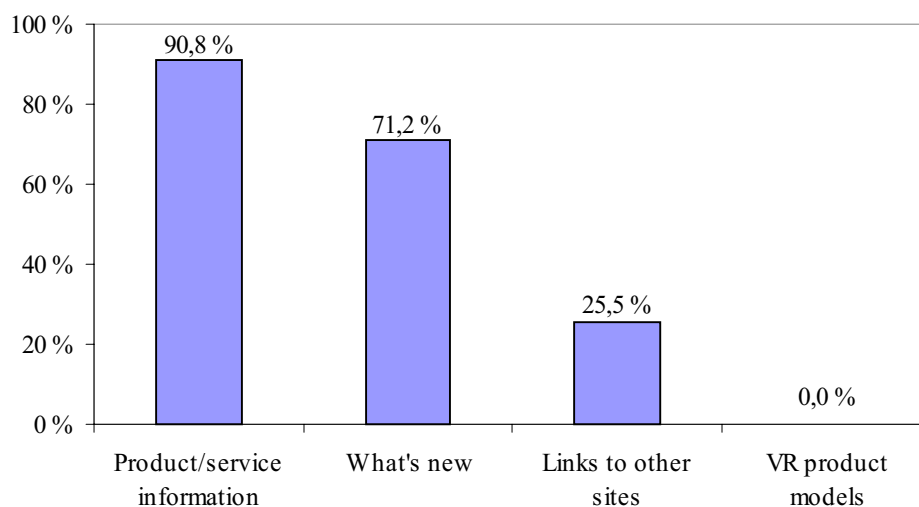


Fig. 4. Presentation features.

3.3. Interaction features

In our survey, 77,1% of the companies provided feedback facilities, requesting consumers to respond about their services (see Fig. 5). However, the implementation of feedback varied greatly between the sites. E-mail-based services were offered with more than one fifth of the sites (21,2%), while the rest provided form-based feedback facilities. Out of the latter, three out of four companies (76,3%) provided a single feedback form for all departments of the company, while only every sixth company (17,2%) provided different form types or a possibility to target the message to a specified department. Yet, some companies (6,5%) provided feedback only to the webmaster of their site. Quite interestingly, only 7,2% of the web sites offered FAQ lists and 3,9% provided guest books requesting consumers to sign in by providing their names and addresses.

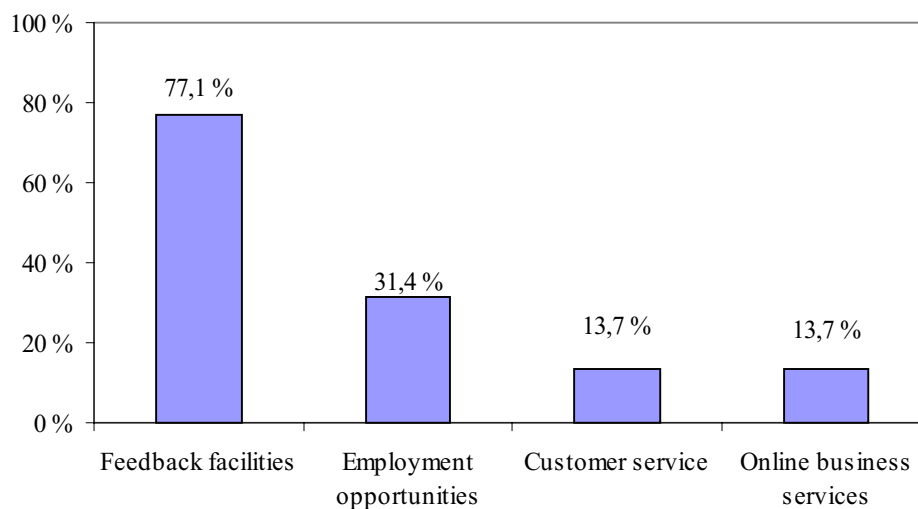


Fig. 5. Interaction features.

As many as 31,4% of the companies offered information about employment opportunities. Out of this relatively high percentage, about half of the companies (52,1%) provided advertisements, while the other half also offered application forms for jobs. Surprisingly, not very many companies offered online business services or customer service via the Web. The percentage for both of these services was 13,7%. The products/services sold through the Web included phones, mobile phone services, flight tickets, books, chocolate, oil, and software development kits. It was also possible e.g. to subscribe to magazines, reserve a car for a test drive or buy ferry cruise tickets. The relatively low percentage may perhaps be explained by the fact that some of these companies were not directly involved with consumer markets.

3.4. Navigation features

In our survey, specific navigational support was very low (see Fig. 6). Only 24,8% of the sites provided site maps or conceptual maps (graphical overviews) about products/services. In fact, 85,3% of these offered either outlined lists or lines and text instead of graphical presentations. Very surprisingly, only 16,7% of the sites offered any search facilities. Out of these, 79,2% offered simple text string facilities for all textual information on the site, while only a few sites offered support for a specified search for products or news about products. Only 3,3%

provided guided tours through the site or through the product/service range, and none offered personalised information based on user profiles or the user's behaviour during the visit.

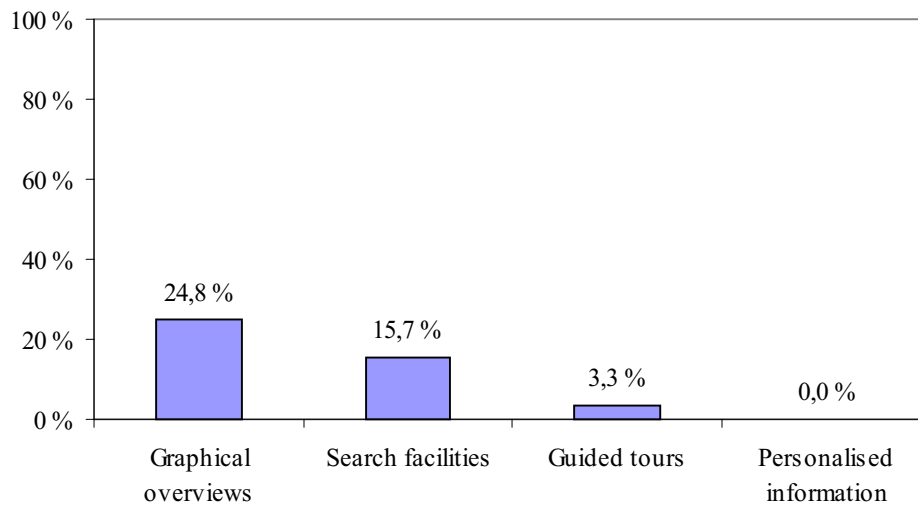


Fig. 6. Navigation features.

3.5. Remarks

Some very interesting and important remarks can be made based on these figures. Firstly, vendors do not currently take advantage of rich product presentations. This was unexpected, because product or service differentiation has been claimed to be the key means of competition through Web technology (Liu et al., 1997). Secondly, support for searching, navigating and comparing products is currently very limited. This, too, is surprising, because it is widely known that consumers are interested in finding goods that satisfy their needs or desires and in comparing different goods from different vendors (cf. Malone et al, 1987, Bakos, 1991). On the one hand, Palmer (1997) suggests that the advantage of the Web compared to other retail formats, such as in-store, catalogue or cable-TV shopping, is in providing comparability of products. On the other hand, Baty and Lee (1995) claim that the current trend is still toward increasing differentiation for the vendor and less comparability for consumers.

4. Comparison between the U.S. and Finland

This survey tackles the Finnish companies, while Liu et al. (1997) have implemented a similar kind of a study with companies in the U.S in Fall 1996. For a comparison of the common characteristics between these two studies, see Table 1. An asterisk denotes a statistically significant difference found between the U.S. and Finnish companies.

As regards general features, Finnish companies presented more often index/directory information, e.g. addresses and phone numbers of branch offices (Chi-square value = 78,456, p-value = 0,000). With regard to presentational features, there were more links from the Finnish sites to other sites (Chi-square value = 6,839, p-value = 0,009). The latter finding may be explained by the fact that the U.S. study was implemented more than two years before the Finnish study, which means that there was more material to provide links to, but some other explaining factors (perhaps cultural) may also exist. The reason for the former finding remains a mystery, even if it may perhaps be partially explained by the time factor. In any

case, it should be kept in mind that contextual linking of information is one of the key issues for designing Web information systems, and that searching for details such as phone numbers and street addresses often is the sole reason for Web usage.

Table 1. Comparison between Finnish and U.S. web sites.

<i>Feature</i>	<i>Finland</i>	<i>U.S.</i>
Product/service information	90,8 %	93,2 %
Company overview	88,9 %	86,1 %
Feedback facilities	77,1 %	79,3 %
Index/Directory*	73,9 %	29,9 %
What's new	71,2 %	71,1 %
Financial facts	55,6 %	53,7 %
Employment opportunities	31,4 %	33,7 %
Links to other sites*	25,5 %	15,3 %
Search facilities*	15,7 %	40,1 %
Customer service*	13,7 %	44,9 %
Online business services*	13,7 %	26,2 %
Message from CEO	11,1 %	11,2 %
FAQ	7,2 %	7,1 %
Guest book*	3,9 %	30,3 %

In terms of interaction, companies in the U.S. provided much more customer service (Chi-square value = 43,436, p-value = 0,000) and online business services through the Web (Chi-square value = 9,134, p-value = 0,003). It seems to be so that companies in the U.S. are way ahead of their Finnish counterparts (and probably the rest of Europe, too) in selling/purchasing goods through the Web. This may be partially explained by the cultural differences between the U.S. and Europe in consumer purchase behaviour, e.g. in the attitude towards utilising credit cards. However, there is much to do for the European companies to keep up with the pace. An interesting detail is also that U.S. companies utilise the idea of guest books, while Finnish companies have almost totally neglected them (Chi-square value = 41,750, p-value = 0,000).

An important finding with regard to navigational features is that companies in the U.S. provide search engines for users to locate available items within the company's own web site much more often than their Finnish counterparts do (Chi-square value = 27,753, p-value = 0,000). Because finding the goods is one of the prerequisites for selling them, Finnish companies have neglected a central feature of e-commerce.

5. Discussion of the findings

Hoffman and Novak (1996, 1997) describe the Web as a new competitive paradigm by being a hypermedia computer-mediated environment. Yet, according to Järvenpää and Todd (1997) stores on the Web are still nothing more than electronic versions of catalogues that fail to take advantage of the interactive features of hypermedia. They have also found out that consumers are satisfied with respect to product perceptions in the breadth of stores but not in the depth of stores, and that consumers are looking to the Web for value-added services and offerings that cannot be easily provided through other retail formats.

The findings in our survey suggest that support for contemporary hypermedia in Web information systems remains very limited. Yet, hypertext functionality may help transform an organisation's set of Web pages into a competitive Web information system that supports consumers' knowledge processes. For this reason, Web information systems should be designed to better take consumers into account through support for Web navigation, consumer interaction and product presentation (Oinas-Kukkonen, 2000). For instance, interactive maps, guided tours, rich links and other metadata may improve the quality of service. For a more detailed discussion on different hypertext features and Web usability, see (e.g., Bieber et al., 1997).

Maps show the structure of information in a graphical manner: global maps provide an overall picture, and local maps provide a detailed picture of the local neighbourhood of the information focus. Interactive maps can also apply user profiles to metadata, and then tailor the overview appropriately and automatically. Guided tours (Trigg, 1988) are associative networks or trails through information. Authors can prepare multiple "recommended paths" and readers may wish to remember and share these with others. Guided tours may focus on different aspects or be tailored to the needs of different readers, and continuity and guidance distinguish these from random links in documents. The guided tours can also be filtered through metadata, making only the ones most relevant to the current item available as detours.

Even though products are often grouped to promote purchasing behaviour as opposed to grouping by attributes (Baty and Lee, 1995), users could express preferences about product attributes to guide navigation through the network of information. The consumer benefit from metadata is increased effectiveness, in that better information with reduced uncertainty factors is provided, thus helping decision-making. Metadata can provide the sellers and commercial sites with added value through better product differentiation, and through improved customer attitudes or market shares. Yet, the metadata approach has also some limitations. It assumes that consumers have well-formulated preferences and understand them, and it also assumes a single generic product hierarchy (Baty and Lee, 1995). Still, in the near future it will probably be much easier to implement rich link attributes and other metadata (Oinas-Kukkonen, 1998), and build services on top of them, e.g. through eXtended Markup Language (XML). XML may have a great impact on Web applications and some expect it even to become a de-facto standard for developing Web information systems.

Richer hypertext support may facilitate better use experiences among Web users, which in turn may lead to positive results in terms of consumer purchasing behaviour. In order to see richer hypertext applications starting to appear, sound principles, methods and tools for enriching Web information systems need to be developed as well. Another natural step for further research is to study user behaviour of online shopping, which may include consumer navigational, purchase and other behaviour.

This study focused on large businesses' Web commerce. However, according to Armstrong and Hagel (1996), the real value of Web-based marketing comes from cross-selling products and services by many different vendors and to the same consumer community. A step towards this direction may be taken through different kinds of software agents or intelligent browsers, which may enhance product finding and comparison between vendors. Taxonomies of shopping agents usually involve the dimensions of agency, intelligence and mobility (Adam et al., 1996), and these may be e.g. decision agents or demand agents, in which data mining

extracts patterns, associations, and anomalies from large databases and data sets. Intelligent browsers have been developed to directly facilitate browsing by learning the user's interests and providing a guided tour of products, while intelligent agents perform tasks in the background while the user is performing other tasks (O'Leary, 1997).

Finally, a limitation in our survey is that it does not reveal the style of product information the companies actually provide. However, to recognise this, we refer to Salam et al. (1998), who borrowed a well established classification system from marketing and advertising literature to study the type of information provided by the U.S. corporations through their Web sites. Their results can be divided in three categories. Most common cues were price or value, performance, quality and safety, which appeared in 40-50% of the Web sites. The second category consisted of taste, packaging or shape, availability and components or contents, which appeared in 20-30% of the Web sites. Independent research, special offers, and guarantees or warranties appeared on approx. 10% of the Web sites. None or almost none of the Web sites displayed company research, new ideas or nutrition facts.

6. Conclusions

This paper has examined the Web-based services provided for consumers by the 250 largest Finnish companies. It was found out that 76,4% of the companies maintain a public Web site, and that higher revenue companies are more likely to be present on the Web.

An analysis of the data revealed useful insights in how companies use the Web to interact with consumers. General features, such as company overviews, have normally been addressed. Presentation facilities have generally been well addressed in terms of providing information about products/services and about what's new in relation to products or on a Web site. Yet, only 25,5% of the sites provide links to other sites. In terms of interaction, most of the companies provide facilities for feedback and many provide information about employment opportunities, but only 13,7% of the companies provide online business services, and the same percentage also applies to customer service. Navigation was found to be the most neglected area, even though it is the very area, which actually provides many of the benefits of the Web. Only 24,8% of the companies provide graphical overviews to product information or their sites, and even less provide other navigational capabilities, such as a search facility or guided tour.

When compared to their U.S. counterparts, it was found out that the U.S. companies are much more eager to sell and provide customer service via the Web. The U.S. Web sites are also more advanced in terms of search facilities. Yet another difference was found in the utilisation of the idea of guest books. On the other hand, Finnish companies presented more often index/directory information of the company and they were better linked with other sites. Even if these may be partially explained by the fact that the U.S. study was implemented much earlier than the Finnish study, some other explaining factors may also exist. The difference between the U.S. and European Web sites is an interesting subject for further studies.

Overall, the findings suggest that support for contemporary hypermedia in Web information systems remains very limited. Richer hypertext support, such utilisation of link attributes or other metadata and provision of interactive maps and guided tours about product/service information, may facilitate better use experiences among Web users, which in turn may lead

to positive results in terms on consumer purchasing behaviour. Therefore, we suggest that the consumer-oriented design of Web-based electronic commerce systems should emphasise hypertext features. The design of electronic commerce systems specifically as hypertext information systems provides the companies with the kind of competitive advantage that is becoming quintessential in the marketplace. It is not sufficient anymore merely to be present on the Web – one also has to distinguish oneself from competitors. For this reason, a deeper understanding of hypertext functionality is needed to build such systems, and this knowledge needs to be tightly integrated with the complete external business process, including electronic marketing and networking, the electronic markets, ordering and payment, and after sales activities.

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