E-Commerce participation by agribusiness SMEs: Web presence, web functions and web-site usability

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Abstract: Only one third of the agribusiness SMEs in the five northern states of Germany are currently present on the Web. Using search engines 95 percent of these web-sites could be found. The orientation towards e-commerce is not strong; only one of five of the web-sites were suitable for conducting transactions.

Keywords: agribusiness, SME, E-Commerce participation

1 Introduction

E-Commerce is one of the most discussed themes in economies at the moment. Almost every day there is a new survey about e-commerce and its effects on companies. Many of these surveys claim that companies, will go out of business soon if they do not adopt e-commerce. A survey conducted by "Initiative Industriekultur" (1999) in November 1999 showed that nearly 90 percent of SMEs have their own web-site. Unfortunately, this survey did not provide data for individual industries.

The purpose of this paper is to find answers to the questions: How many agribusiness SMEs are present on the Web? Are agribusiness SMEs more or less often active in the WWW than SMEs from other sectors? How difficult is it to find the web-sites of the agribusiness companies on the web? Which types of functions are provided by agribusiness web-sites? Are there differences between the branches of the agribusiness? In addition, web-sites that had been inspected in a web-site survey in 1998 were visited again in order to identify changes in the web-site usability (Jessen and Müller, 1998).

2 Survey sample

For the study I used a list of agribusiness companies, defined as business connected with the farm sector (Biere, 1988), from the chamber of commerce and a another list of agribusiness cooperatives from cooperative associations. The companies comply with the definition of SMEs by the Federal Government of Germany according to which SMEs have more than 10 and less than 500 employees and a turnover of less than 100 Mio. DM (Bundesministerium für Wirtschaft, 1996). The list of cooperatives from the cooperative associations contained no information about the firm size.

After elimination of doubled entries, bankrupted companies and cooperatives, and those who grew beyond the limits of a SME, the sample contained 824 agribusiness companies and 275 cooperatives. All companies and cooperatives are located in the five northern states of Germany.

3 WWW participation by agribusiness SMEs

The first question of interest is: How many of the companies are currently engaged in WWW activities?

To locate the web-sites of the companies, I used search engines popular in Germany, i.e. www.google.com, www.metager.de, www.web.de and www.fireball.de, and link catalogs, such as www.lebensmittelpraxis.de, www.agroonline.de, www.vdb.de, www.grznord.de and www.raiffeisen.com. Names and locations of the companies were used for the search requests. The search was completed, when a web-site of a company was found with one of the search engines or link catalogs. If a company had more than one URL-address for its web-site, only one was recorded.

For the sample of 1099 companies and cooperatives 369 web-sites (33.6 percent) were found. Of all German companies about 47 % are presented on the Web (Empirica, 1999) and agribusiness is under-represented on the Web. As shown in Table 1, large differences have been found concerning the activity in the Web between the branches. A correlation test between branch and activity in the Web yield a Cramer-V of 0,234 and was significant at the 1 % level.

[Table 1 here]

4 Effort to locate the web-sites

Finding the web-site of agribusiness SMEs is not easy, even if a search engine is used. It is well known that search engines often provide no results or a large number of irrelevant results. It was checked how good web-sites of agribusiness SMEs could be found by search engines. For the evaluation four search-engines were used: www.google.com, www.web.de, www.fireball.de and www.metager.de. Metager.de is a meta search-engine that uses the following search-engines: www.netfind.de, www.lycos.de, www.altavista.de, www.netguide.de, www.yahoo.de, www.witch.de, www.dino.de, www.infoseek.de, www.t-online.de and www.excite.de.

For this evaluation known web-sites were checked if they were working. For the search request the name and the location of the firm was being used. If none of the search engines could find a web-page, the search request was varied in all possible ways. If a search engine had found the web-site of the company it was counted on which page of the result list (ten results per page) the result was listed. When the web address of a company was not included in the first five pages of search engine results, this company was marked as "not be found per search engine". Could the web-site of a company only be found by means of a link catalogue and the catalogue was listed within the first five pages of the result list, the firm was marked as "found per link catalogue".

[Table 2 here]

From all companies only 31 (8.4 percent) could not be found with any of the four search engines or with the help of a link catalogue. Often it was much easier to go to the web-site of a firm directly by combining the name or a acronym of the firm with .de or .com. Problems occurred during the search for web-sites from subsidiaries, who do not have a web-site of their own. Some luck is then required to find the web-site of the corporation that owns the subsidiary. As shown in Table 2 the search engine with the best yield of agribusiness web sites was google.com. Furthermore, it is sufficient for the user to inspect the first two pages of results from any search engine. If an address is not listed on the first two pages, it is unlikely to appear on any page.

5 Types of functions on the web-sites

Having established how many agribusiness firms are on the web and how easily they could be located, I inspected the functions offered by the web-sites. The following categories of functions can be found:

- **URL-address reserved:** The company has reserved a URL-address, but no further information can be found at the page.
- **Business card:** The company has a web-site, but the site contains only general information such as the logo, address and telephone-number of the firm.
- **Homepage:** A web-site is available, which contains more information about the company and the products then the "business card".
- **Comprehensive company information:** Information like the number of employees, turnover, history or a product catalogue can be found.
- **Email contact possible:** The web-site contains a link for Email or the Email-address is given. It is not obvious to find an Email-link or –address on a homepage of a company.
- **E-Commerce:** It was checked, if a shop could be found or online-ordering is possible on the web-site.

[Table 3 here]

Only 21.2 percent of all companies with web activities offered e-commerce capabilities. However, products such as glasses, caps, shirts and lighters are offered but not products of the core business. Surprisingly 11.3 percent of all companies that are on the web provided no option to make a contact with visitors of the page via e-mail and 20.6 percent decided against offering comprehensive company information.

A test for correlation on basis of Cramer V was carried out for the branches and the types of functions offered at the web-sites. Except of a correlation between the branch and the option for e-commerce no significant correlation could be found. For the correlation between branch and the option for e-commerce Cramer V reached to 0,33 and was significant at the 1 % level.

6 Changes in usability since 1998

In 1998 the web was a new medium for communication and most companies had to learn, how to use the web effectively. Since then the companies had two years to improve the usability of their web-sites, but did they so? Are there new factors who restrict the usability of the web-sites? All cited values for 1998 are from Jessen and Müller (1998).

Like in 1998, all web-sites were visited and a checklist was used for the examination of the web-sites. To check the speed of the server the robots of Netmechanic (www.netmechanic.com) and Alexa (www.alexa.com) were used. Alexa was also used to measure the average age of and the traffic on the web-sites.

[Table 4 here]

6.1 Simple URL-address

URL-addresses are simple when they use an acronym of the company name or a brand name. Nearly all (96 percent) of the companies use simple URL-addresses, in contrast to 86 percent in 1998. Only one journal changed the URL-address to one that is more difficult to use.

6.2 Speed of and time needed for transfer

Even though the costs for being online have decreased in the last two years, no user is willing to wait for several minutes to download a page. Nielsen (1996) postulated in 1996, that the first pages has to be submitted completely within 10 seconds or the potential visitor of the page will cancel the transmission. The time needed for and the speed of transfer were measured in three different ways:

- With empty cache-memory the time for submission from the web-server to the PC of the author was stopped;
- using Alexa robot;
- using Netmechanic robot.

[Table 5 here]

In comparison to 1998 the transfer rates have grown. The number of web-sites that needed more than 10 seconds for building up the first page has doubled. This may be due to applications like flash technology and java script. The share of web-sites that are readable in a non-graphic-mode has not changed in the last two years.

6.3 Topicality of the web-sites

There are surprisingly many web-sites that contain outdated information. Often web-sites are still "under construction" or since one ore two years inform the visitor "In a few weeks you will find here the internet presentation of the XYZ-company". In 1998 most web-sites were new, so they were rated as "up to date", but is this still true two years later?

[Table 6 here]

In the last two years the share of updated web pages has not changed, but large shifts occurred in the topicality of the web-sites. The share of web-sites younger than three months decreased from 92 % in 1998 to 82 % in 2000.

6.4 Links

The effective use of hyperlinks is one of the advantages of the web. In the 1998 survey only 27 % of the web-sites used hyperlinks. Since then the use of hyperlinks has nearly doubled and 46 % if the sites used hyperlinks in 2000.

6.5 Email-contact

Direct communication on the Internet between two or more participants mostly occurs by email. 95 % of the web-sites provided an email-address in contrast to 88 % in 1998. Also the share of companies, that placed their email-address in such a way, that a visitor is unlikely to find it within 10 seconds has decreased from 30 % in 1998 to 22 % in 2000.

6.6 Frames

Frames have some advantages but also some disadvantages. Some authors e.g. Nielsen (1996) advised against the use of frames. For navigation frames have the advantages, because they allow the designer to define one style for the whole web-site (Siegel, 1997). The use of frames has decreased in the last two years at the homepages. In 2000 frames are used at 48 percent of the homepages, in contrast to 55 percent in 1998. Homepages on the basis of flash-technology could be found at 5 percent of the web-sites visited. On the content pages a change in the use of frames could not be observed. In 2000 frames were used on 68 percent of the content pages, compared to 69 percent in 1998.

6.7 Browser-compatibility

Recently, browser-compatibility has become an issue. Many web-sites are optimised for MS Internet Explorer. If a visitor uses a different browser, e.g. a Netscape Navigator, it may happen that some functions offered on the web-site are disabled, or that the appearance of the page is disarranged. All web-sites were inspected with MS Internet Explorer 5 and Netscape Navigator 4.713. In 1998 82 % of the web-sites could be used with any browsers, but in 2000 this was only true for 69 % of the web-sites. Netmechanic offers a free check for browser compatibility for 20 pages of a web-site. This robot found that only 18 % of the web-sites can be viewed without an error by all visitors regardless of the browser used. This gap between the results is due to the browsers used by the author and the featuresof the Netmechanic robot, which checked the web-sites also for older versions of MS Internet Explorer and Netscape Navigator as well.

7 Conclusions

Over all, the agribusiness in the five northern states of Germany is underrepresented on the web, but there are huge differences between the branches of the agribusiness. Also, there is no strong orientation by the SMEs of the agribusiness to relocate their business activities to the Web. The changes in the web-design in the last two years brought some improvements, but also some deteriorations. These assessed deteriorations have a large negative influence to the accessibility of the web-sites.

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Tables:

Table 1. Branch of economic and WWW activity

	Companies		**Companies present on the WWW**	
Branch of economic activity	**Number**	**Percent**	**Number**	**Percent**
Diary industry	104	9,5	20	19,2
production of animal feeds	231	21,0	61	26,4
Slaughter and meat-processing	207	18,8	55	26,6
Flour and feed milling	36	3,3	11	30,6
Food industry (e.g. coffee, sugar, pastries, pasta, confectinery, seasonings, dietetic foods and the like)	212	19,3	73	34,4
Services for farmers	27	2,5	10	37,0
Fish-processing	48	4,4	20	41,7
Fruit- and vegetable- processing	43	3,9	19	44,2
Beverages, spirits and soft drinks production	105	9,6	58	45,7
Production of agricultural machinery	50	4,5	28	56,0
Production of fertilizer and pesticides	8	0,8	5	62,5
Other food industry	19	1,7	12	63,2
Production of vegetable and animal oils and fats	9	0,8	7	77,8
Total	**1099**	**100**	**369**	**33,6**

Table 2. Effectiveness of search engines for finding agribusiness sites

	Search engine			
Web-site found on page:	google.com	metager.de	web.de	fireball.de
1	280	251	202	168
2	4	5	5	8
3	3	2	0	2
4	0	0	0	0
5	0	1	0	0
Web-site not found with a search engine	60	85	130	141
Web-site found with a link catalogue	22	25	32	50
Total	369	369	369	369

Table 3. Types of functions offered on the web-sites

branch of economic activity	URL-address reserved	Business card	Home-page	Email contact possible	comprehensive company information	E-Commerce
			- in percent -			
Services for farmers	0	10	90	80	70	10
Other food industry	0	20	80	80	70	0
Slaughter and meat-processing	2	4	94	90	66	20
Fish-processing	10	5	85	85	65	10
Fruit- and vegetable-processing	5	11	84	95	84	16
Production of vegetable and animal oils and fats	0	14	86	86	86	0
Diary industry	0	10	90	95	90	5
Flour and feed milling	18	0	82	73	73	9
production of animal feeds	3	8	89	92	77	33
Food industry (e.g. coffee, sugar, pasta, pastries, seasonings, and the like)	6	4	90	89	82	23

Beverages, spirits and soft drinks production	2	4	94	89	89	44
Production of fertilizer and pesticides	0	0	100	100	100	33
Production of agricultural machinery	0	3	97	93	93	0

Table 4. Type and number of organizations

Category	**Number**
Small medium sized enterprises	18
Corporate	13
Subsidiary	8
Food retailing	6
Government department	4
Farmer federations	5
Journals	6
Total	**60**

Table 5. Transfer duration from the web-server.

Attribute	**Percentage of web-sites**	
	2000	**1998**
buildup first page > 10 sec	65	33
Evaluation of transfer speed		
Alexa[1]		
fast	21	0
average	77	56
slow	2	44
Netmechanic[2]		
excellent	0	0
very good	0	9
good	45	30
fair	39	30
poor	16	31

[1] Due to changes in the measurement scale Alexa classified a server in as "fast" 2000 (1998) if the effective transfer rate is faster than 56 kb/s (50 kb/s). To get an "average" the server must be faster than 14.4 kb/s (28.8 kb/s). A server is classified as slow, if the transfer rate is slower than 14.4 kb/s.

[2] Netmechanic measures the duration of the transfer rate of a 10 kb file about 8 hours every 15 min. The ratings are proportional to all measures done by Netmechanic robots. A server is classified as "excellent", if it is faster than 80 percent from all measured servers. To be an "very good" server, the server must be faster as 60 percent of the measured servers. To get a

"good" the server had to be faster than 40 percent of all measured servers. In the class of the "average" servers, the server must be better than 20 percent of the measured servers. In the group of the "slow" servers, you can find the lower20 percent of all tested servers.

Table 6. Actuality of the presented information

	Share of web-sites in percent	
Degree of actuality	**2000[1]**	**1998[2]**
updated web pages	84	85
Topicality of web-sites[3]		
stale	4	0
average	10	0
good	4	8
very good	31	21
fresh	51	71

[1] n = 49 [2] n = 24 [3] measured with Alexa. The Classification based on the age of the web pages. A fresh web-site is younger than one week. The topicality is called "very good" until an age of three months. To have a good topicality, the web-site has to be younger than 6 months. To get an "average" the web-site must be younger than 12 months. A "stale" web-site is older than 12 months.