

Extended Web Assessment Method (EWAM) - Evaluation of Electronic Commerce Applications from the Customer's Viewpoint

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Article accepted for publication in the International Journal of Electronic Commerce, Vol. 7, No. 2, Winter 2002-2003

ABSTRACT: The paper presents and applies the Extended Web Assessment Method (EWAM) an evaluation tool which has been specifically created for the assessment of e-commerce applications. EWAM is one of the oldest evaluation methods of its kind. It has been revised and improved over the years. EWAM builds on the Web Assessment Method developed at the University of St. Gallen, Switzerland and integrates findings from the Technology Acceptance Model and several alternative approaches. It defines an evaluation grid including a set of criteria to appraise the quality and success of existing e-commerce applications. The focus lies on consumer perspectives and the specific features of the Internet as medium. In order to illustrate how the EWAM tool works, an analysis of commercial Web sites in two different business sectors – consumer goods and e-banking – was performed. The findings show that according to the assessors most of the Web sites assessed do still not fully meet their expectations.

KEYWORDS AND PHRASES: Internet, electronic commerce, e-shops, on-line shopping, web assessment, evaluation, method, B2C

This article presents and applies the Extended Web Assessment Method (EWAM), an evaluation tool which has been specifically created for the assessment of e-commerce applications. A major problem posed when searching for possible improvements of e-commerce applications is the question of the criteria used to determine the success of such a system. This is where EWAM comes in, by offering a set of relevant criteria which provide a basis for measuring the quality of Web sites of Internet businesses. The prescribed criteria enable existing Web sites to be evaluated from the customer's point of view. To do this assessors have an online tool at their disposal with whose help data can be collected and evaluated. By defining sector profiles, comparisons of a Web site with the sector average or with the Best Practice Profile can be made. This benchmarking can ultimately be used to suggest steps for improvement.

In order to illustrate the application of the method we included the findings of an empirical study carried out in April 2001. Twenty students from an executive training class in E-Business completed the Web assessment forms, evaluating Web sites of two different business sectors: consumer goods and e-banking.

The current studies represent evaluations from B2C Web sites. However, due to its general criteria catalog, the EWAM tool is suited for B2B e-commerce applications likewise. EWAM is complex in nature and was created for detailed analyses of a selected sample of Web sites from one sector. It does not support the processing of mass evaluations of hundreds of Web sites.

Before starting this project the students were thoroughly instructed in the use of the tool. Additionally, they had to provide a qualitative analysis of the eight Web sites in the form of a written report. The fulfillment of this task was needed for a successful attendance of the class. Only Web sites which were intensively used or tested by the assessors were investigated. The assessors being well-instructed Web experts, the sample was intended to represent a small quantity of opinions of highly-qualified users. The evaluations resulted into Web assessment reports which compare the individual performance profile of three companies with the “best of its class” (best practice profile) and the general sector profile (aggregation of all companies in the same sector).

Since the study was conducted in Switzerland, the results represent a Swiss perspective. E-business is still a very regional affair, making it hard for consumers to assess Web sites in countries other than their home country. Nevertheless, we included a German and a US company in our sample to make the study more interesting and to add an international perspective in a study about the inherently global Internet commerce environment.

The current EWAM is extensively used in research, teaching, and consulting. The training of the assessors is an important learning process where students are confronted with the basics of high-quality e-commerce services. The automated tool makes it possible to offer professional assessment services for companies. In these specific sector assessments, companies of the same sector are compared against each other. The company for which the report is generated is subsequently able to deduce points of improvement for their e-commerce application. This order-related research is an important financial resource for further improvement of the EWAM.

The paper starts with a description of the methodology of the Web Assessment explaining its origins and the latest adjustments to advances in technology and Web site design. We then describe our empirical study and the way in which we prepared the results. Four companies from both sectors (consumer goods and e-banking) are briefly introduced and the findings for the sector are discussed in detail. The paper concludes with some remarks about the current state-of-the-art in Web site design and functionality and their suitability for e-commerce transactions.

This article is the most extensive of all publications about the EWAM. It contains history, extensive description of the model, statistical background work, as well as findings from two sector assessments: retailing and e-banking.

Theoretical background

The following paragraphs describe the origins of EWAM. Credit is given to the literature and alternative approaches by which it was influenced.

The original Web Assessment Method

The Web Assessment Method was developed in 1997 at the Competence Center for Electronic Markets (CCEM) at the University of St. Gallen in conjunction with the company partners. The original impulse

arose from the discontent felt by industrial partners of the CCEM about unsatisfactory results of e-commerce applications already carried out [20, 21, 18].

The method defines an evaluation grid with a set of criteria to appraise the quality and success of existing e-commerce applications. Besides the rigorous focusing on consumer perspectives, the success in implementing the offer of products and services is considered with reference to the specific features of the electronic medium. Successful Internet business activity requires the following paradigms to be taken into account:

Electronic markets and transaction phases: The Web Assessment Model examines the three classic transaction phases of electronic markets (information, agreement and settlement). A fourth element, the 'community component', is integrated as a link between the actual purchase transaction and the necessary trust relationship in the virtual realm.

Information technology/media-inherent characteristics: Where marketing aspects are concerned, the Web Assessment model focuses on the special features that are inherent in the Internet. The assessment criteria are, besides the transaction phases and community component, derived from the characteristics of the electronic medium: hypermedia presentation, database interface (expert system), 24-hour access, anonymity, ubiquity, configuration possibility of the user surface, integration with the customer and asynchronous communication.

Performance marketing: The underlying idea of performance marketing is that the client should not only be sold the core product, but should additionally be offered a range of complementary products to maximize customer satisfaction. These additional services customize the product and make it attractive for the client. In the difficult arena of international competition product differentiation is thus made possible.

In an empirical study carried out in 1997/1998 more than 70 questionnaires were collected and evaluated from over 55 different participants (researchers and practitioners) [18]. The result of the study was a comparison of the individual performance profile of two companies (SwissAir and Amazon.com) with comparable offers from competitors in the same sector. At the same time in this initial application of the Web Assessment Tools the special strengths and weaknesses of the companies could be identified.

The Web Assessment Method, developed in 1997, represents a step towards the all-embracing evaluation of existing e-commerce applications from the customer's point of view. As a result of technological progress and the accompanying value change among users since the development of this method, it was thought necessary to adapt the questionnaire for the purpose of data collection and identification of success criteria.

In summer 2000 the method was fundamentally revised; besides taking account of new research findings – especially in the Internet marketing field – it also incorporated the Technology Acceptance Model (TAM) [1], established for the acceptance of information systems, which will be briefly described in the following paragraph.

Technology Acceptance Model (TAM)

With the Technology Acceptance Model Davis describes the effect of system features on the acceptance of users with regard to new computer-based information systems. Davis chose the 'Fishbein Model', a psychological behavior model, as the basis for the development of the TAM. This model, specified by Fishbein in 1967, was extensively analysed by Fishbein & Ajzen [2] and further elaborated into the 'Theory of Reasoned Action'.

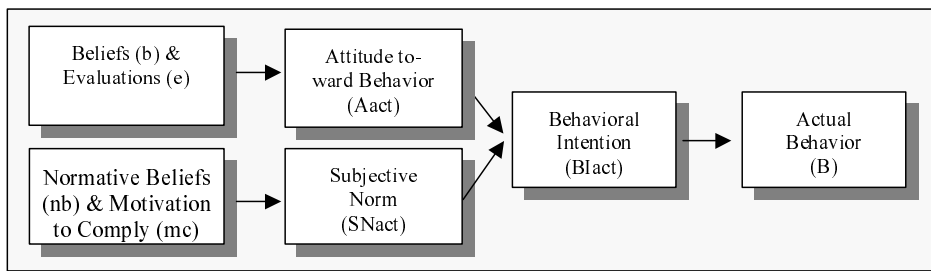


Figure 1: Theory of Reasoned Action (TRA)

The TAM follows the causal chain of the TRA: “Attitude” → “Intention” → “Behavior”. Building on this Davis suggests for the basic model of the TAM the following schematic diagram:

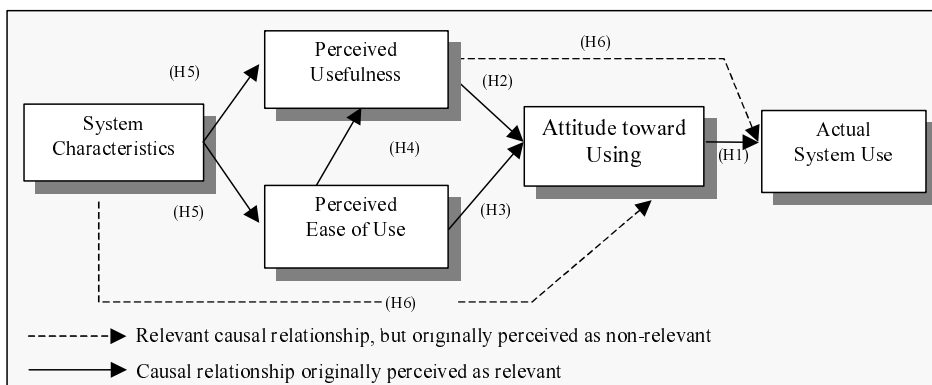


Figure 2: Causal diagram of TAM

Figure 2 illustrates the TAM as it resulted from the empirical study. The relationship between the individual variables is in the form of arrows, and documents the corresponding correlation coefficients. The hypothetical relationships defined in the basic model were tested empirically using a questionnaire (with questions on e-mail and XEDIT) followed by regression analysis.

According to Davis, out of 120 questionnaires distributed to employees of IBM Canada's Toronto Development Laboratory, 112 were returned completed ($n = 185$, of which 109 regarding e-mail and 76 about XEDIT). The resulting evaluation confirms several hypotheses...

- (H1) ‘Attitude’ has direct influence on ‘Actual System Use’.
- (H2) ‘Usefulness’ has significant effect on ‘Attitude toward Using’.
- (H3) + (H4) ‘Ease of Use’ has an effect on ‘Attitude’ and ‘Usefulness’.

... and provides further findings which were not expected in this form:

- (H5) ‘System’ has a significant effect on ‘Ease of Use’ but not on ‘Usefulness’.
- (H6) ‘Usefulness’ has a direct effect on ‘Actual System Use’.
- (H7) ‘System’ has a direct effect on ‘Attitude toward Using’.

In the TAM the “Subjective Norm” of the Fishbein Model is not integrated, as Davis did not consider it to be relevant. Malhotra and Galletta [12] conclude in ‘Extending the Technology Acceptance Model to Account for Social Influence, Theoretical Bases and Empirical Validation’ that Davis had underestimated the importance of the ‘Subjective Norm’ in the TAM. Their empirically tested study points to the fact that for the user social influences also play an important role in the acceptance and use of new information technologies.

The TAM is an important contribution to understanding the use, behavior and acceptance of new information systems by the user. Thus it also appears suitable for further application as a theoretical base in the Extended Web Assessment Method.

The motivational variables “Attitude toward using”, “Perceived Usefulness” and “Perceived Ease of Use” serve as a link between system features and the behavior of an individual in relation to the use of new information systems (Actual System Use). From this point of view the model is successful [1].

The fact that social components (Subjective Norm) were not taken into account in TAM was criticized in ongoing research [12], which underlines the importance of these components. Hence the social influences were also incorporated into EWAM in the form of criteria regarding “Trust”.

Alternative Approaches

Within the scope of this paper, it is not possible to describe all the different approaches to Web site evaluation which have been developed in recent years. For a detailed analysis and categorization we refer to Totz et al. [23]. In their article the authors file EWAM into the category: (1) market focus (external visibility) – (2) subjective (customer’s quality perception) – (3) attribute specific.

The following alternative approaches to Web evaluation listed below were taken into account during the revision of the Web Assessment Method in the year 2000:

- Expectations and rankings of Web site quality features: results of two studies on user perceptions [25]
- Design quality of Web sites for electronic commerce: fortune 1000 webmaster's evaluations [11]
- The impact of perceived Web site characteristics on Web site traffic [24]
- Perfect Web pages – how does reality look like? [8]
- Web usage mining for Web site evaluation [22]
- Concepts and procedure model for Web evaluation [10]
- GomezPro.com [5]
- JurisNET [7]

Extended Web Assessment Method (EWAM)

The following chapters describe the Extended Web Assessment Method, its components and steps for an examination of a specific business sector. We describe how the findings are analyzed and graphically presented.

Basic Assumptions

The Extended Web Assessment Method (EWAM) builds on the original Web Assessment Method and integrates findings from the Technology Acceptance Model and several alternative approaches. It defines

an evaluation grid including a set of criteria to appraise the quality and success of existing e-commerce applications, which will be presented below. The focus lies on consumer perspectives and the specific features of the Internet as medium.

A successful e-commerce application must meet the needs of the user according to “Perceived Usefulness” (Criteria USEF1-USEF15) and “Ease of Use” (Criteria EOU1-EOU8). Under the headword “Trust” (Criteria TRUST1 - TRUST2) questions about the “Subjective Norm” are additionally taken into account. A success or quality feature must be assigned to one of these categories. The list of criteria is depicted in figure 4 to figure 9.

When evaluating an e-commerce application according to the Extended Web Assessment Method a Web site is first of all allocated to a sector. This serves later during evaluation to identify the reference sector for benchmarking. The success and quality criteria are formulated in general terms and are valid in every sector, but are differentiated by their importance rating. In order to take due account of the differences in the individual sectors, criteria are weighted corresponding to different sector profiles and their relevance in the sector. Hence being up to date with information is of greater importance for the supplier of financial information (e.g. Stock Brokerage, real-time share prices) than for a supplier of consumer goods. With the distribution of digital goods (e.g. software) the choice of generic services (EOU5), for example, tracing and tracking of a parcel, is of lesser importance than with the delivery of a book. In order to be able to undertake specific and high-quality analyses, it is essential to record the level of importance per criterion and per sector exactly. The importance per criterion is recorded on a scale from “unimportant” (-2) through “less important” (-1), “important” (+1) to “very important” (+2).

Trust is the *sine qua non* of e-commerce; without trust no business is done. The creation of a trustworthy environment on the Internet is a major challenge for the success of e-commerce. According to the “Theory of Reasoned Action” [2] “Subjective Norm” refers to how an individual is influenced by a person particularly close to them, and by this person's opinion of a certain way of behaving.

EWAM Components

An EWAM criterion is first of all assigned to a criteria category (“Ease of Use”, “Usefulness” or “Trust”) and within these three categories allotted to one of the four transaction phases of electronic markets (the information, agreement, settlement and after-sales phase), to the community component or to the category “criteria which concern all phases”. Compared with the original Web Assessment Method, EWAM was extended to include the after-sales phase and a category group “criteria which concern all phases”. Figure 3 shows the combination of the Web Assessment Method with the “Ease of Use” and “Usefulness” categories of the “Technology Acceptance Model” together with the “Trust” category taken from the Theory of Reasoned Action (TRA). The “sector 1..n” dimension illustrates the extension of EWAM with sector profiles and the consideration of differing importance of individual criteria within these sectors.

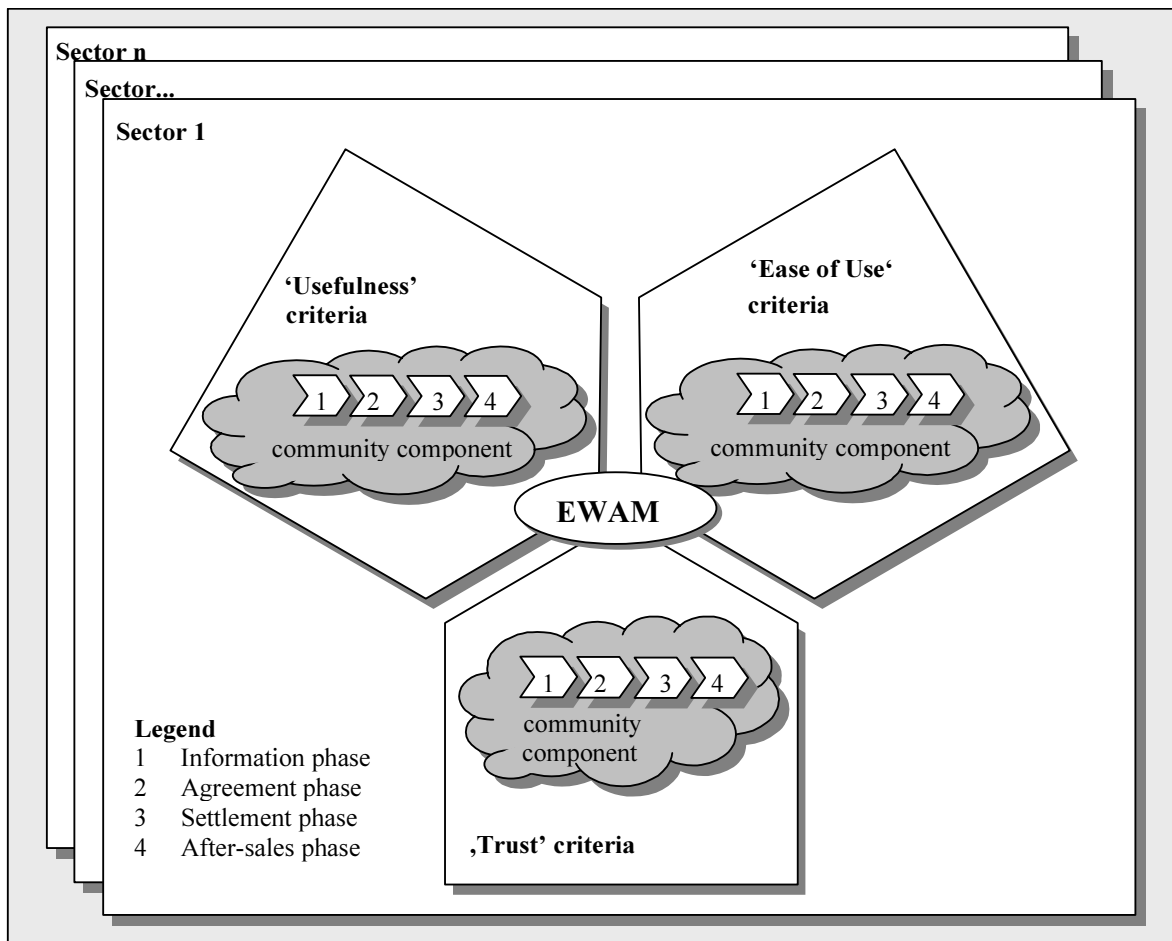


Figure 3: Diagram of the “Extended Web Assessment Method”

Importance Ratings

Similar to ServQual [13] – an instrument for service quality assessment – EWAM is based on a double evaluation for each criterion. In a first step, the subjective importance for an attribute is declared by the assessor. The interpretation of the value “+” is the following: “It is important that Web sites in the retail sector are easily found by the customer”. The next step is the evaluation of all Web sites in the respective sector, in our examples the four companies in one sector included in the sample. The aggregation of the importance ratings of the assessors (step one) is an importance prerequisite for the generation of the results. In those cases where importance is low (“--“) the actual evaluation values (step two) are almost annihilated. As described in the mathematical derivations in one of the following paragraphs the ratings are multiplied by the importance factor. The lower the importance value of a criterion the smaller the impact of this attribute on the overall score (cf. Figure 4). Unlike in ServQual where each of the two questions are compared for every single assessor, EWAM aggregates the importance ratings for multiplication with the evaluations. This procedure is advantageous in two respects: (1) it levels out extreme values for expectations and (2) it also takes into account that assessors dispose of different experience levels.

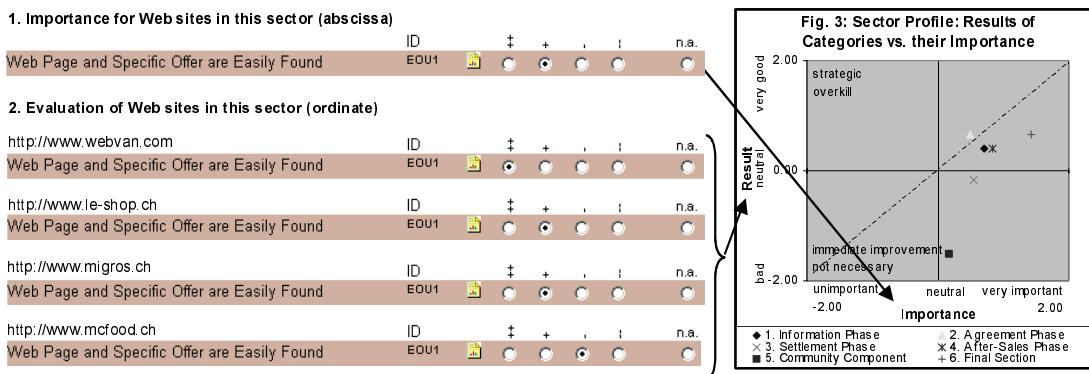


Figure 4: Two step assessment: (1) importance ratings and (2) Web site evaluation

Data collection Using the EWAM Tool

Data is collected over the Internet with an online questionnaire (“EWAM tool”) in which the usual structure of the original tool [21] was almost retained. The individual criteria were assigned to a transaction phase or a community component, and two new sections were added (“After-sales phase” and “criteria which concern all phases”).

When the assessor starts the evaluation with the EWAM tool, as a first step he must record the URL of the Web site under examination and assign it to a sector. The scale of the possible choices is so arranged that the assessor must decide on a positive or negative statement with each value. The scale has four values (++,+,-,--). The alternative value “n. a.” (not applicable) can be used if a criterion is not relevant or not available in a particular context. The criteria are so formulated that a positive (negative) evaluation will also lead to a positive (negative) result. “I strongly agree” always scores (+2), “I slightly agree” (+1), “I slightly disagree” (-1) and “I strongly disagree” (-2). “N. a.” scores nil, which is disregarded with further calculations (e.g., of averages).

1. Information Phase						
-> explanation						
	ID	‡	+	.	!	n.a.
Web Page and Specific Offer are Easily Found	EOU1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good Structure of Content	EOU2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reasonable Information Quantity	EOU3	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality of Content Meets User Expectations	USEF1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost Benefits Passed on to the Client	USEF2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bundling: Good Combination Possibilities for Products/Services	USEF3	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good Recommendation Systems	USEF4	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adequate Application of Hypermedia	USEF5	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 5: EWAM tool: list of criteria in the information phase

2. Agreement Phase
-> [explanation](#)

	ID		‡	+	,		n.a.
Transparent and Interactive Design of Ordering Process	EOU4		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fair and Individual Prices	USEF6		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 6: EWAM tool: list of criteria in the agreement phase

3. Settlement Phase
-> [explanation](#)

	ID		‡	+	,		n.a.
Easy Selection and Good Integration of Generic Services	EOU5		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good Integration in Customer's IT-Infrastructure	USEF7		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Good Tracing and Tracking	USEF8		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 7: EWAM tool: list of criteria in the settlement phase

4. After-Sales
-> [explanation](#)

	ID		‡	+	,		n.a.
Convenient Customer Support	EOU6		<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Satisfying Customer Support	USEF9		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 8 EWAM tool: list of criteria in the after-sales phase

5. Community Component
-> [explanation](#)

	ID		‡	+	,		n.a.
Good Access to Community	EOU7		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good Quality & Quantity of Relationships in Community	USEF10		<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good Quality & Quantity of Content Generated by Community	USEF11		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Purchasing Power	USEF12		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Figure 9: EWAM tool: list of criteria for the community component

6. Final Section
[↑ Top of 'Evaluation Form'](#)

In the final section, you are asked to answer a last set of questions relevant for all of the above mentioned phases and give some personal information about your Internet experience.

	ID	‡	+	.	!	n.a.
Good Availability	EDU8	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good User Interface	EDU9	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improvement in Productivity / Time Gained	USEF13	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactivity	USEF14	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good Contact Possibilities	USEF15	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Trustworthy Business Partners	TRUST1	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in Internet as Platform and Legal Situation	TRUST2	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your Internet Experience		<input checked="" type="radio"/> 3 years or more <input type="radio"/> 1-3 years <input type="radio"/> less than 1 year				

Figure 10: EWAM tool: list of criteria in final section

The criterion “Cost benefits passed on to the client (usef2)” can only be evaluated in case the business has a physical counterpart where prices are different from the prices offered on the Web site.

Data Preparation and Analysis

For the drawing up of meaningful evaluations of any Web site under examination (the Web site compared to the sector average, to best practice profile or to one of its competitors) three profiles were defined in the EWAM.

- *Sector Profile*: the profile of the relevant sector
- *Company Profile*: the profile of the Web site
- *Best Practice Profile*: the profile of the best-of-breed in the relevant sector

EWAM judges a Web site purely from the customer's point of view. The best EWAM result does not necessarily mean that this Web site is the most successful in financial terms, since success is influenced by further factors (e.g. e-business relevance of the offer, profitability, backend integration, financing aspects, etc). A Best Practice Profile can only be established when (a) a sufficient number of different Internet businesses per sector have been evaluated and (b) these have been compared with their customer success in the real world. Accordingly, an adequate best practice data reference base can only ensue from the combination of points (a) and (b).

Personal Web Assessment Report

One of the results of a Web site assessment is a Personal Web Assessment Report containing the following analyses and graphical representations:

- Summary of the individual criteria and results in the categories “1. Information Phase”, “2 Agreement Phase”, “3 Settlement Phase”, “4 After-sales Phase”, “5 Community Components”, “6 Final Section” and a calculation of the total score.

- b) Comparison of the Web sites examined with the sector average and with the sector Best Practice, in the form of a quantitative and graphical analysis, taking no account of the importance rating of the criteria.
- c) Graphic comparison of the results of the first six categories (a, b) with their importance rating for company and sector profile.
- d) Comparison as b) above, but taking full account of the importance ratings of the criteria.

EWAM Findings: Consumer Goods and E-Banking

The following paragraphs present the findings of our study for two different sectors: consumer goods and e-banking. The Web sites chosen stem from Switzerland, Germany, and the USA. Our aim was to also study differences between the countries. The assessors were required to use the Web service extensively before the assessment took place. They were even instructed to contact the customer support with questions, complaints or order changes.

Consumer Goods

Web sites assessed:

- <http://www.webvan.com> (best practice)
- <http://www.le-shop.ch>
- <http://www.migros.ch>
- <http://www.mcfood.ch>

The companies which were chosen for the consumer goods sample are from two different countries: Switzerland and the USA. In order to allow the students to really go through all transaction phases with the American company, we had the goods delivered to a research colleague situated in Berkeley, CA. She reported back on fulfillment, especially about her experiences with the delivery guy and the condition of the goods. The American company, **WebVan** was an ambitious American online venture with a vision “of 26 massive automated warehouses and a national fleet of vans that would deliver groceries – and just about anything else – to everyone in America” [6]. Based on big money investments it is not surprising that WebVan came out as “Best of Class” although the company had been experiencing some problems [14] and had to shut down its operations by mid 2001. **Le-Shop** is a Swiss independent online business which acts as a reseller for food and drugs. Acting solely on the Internet it is not surprising that it was voted “best in Switzerland”. **Migros** is a Swiss store chain selling all kinds of consumer goods with a focus on the food sector. **McFood**, finally, was a small Swiss “newcomer” which had never been able to setup its logistics and was deliberately picked as the “bad example” by the course instructor.

In order to be able to assess the Web sites we had to interview the assessors about their perceived importance ratings for the consumer goods sector. As mentioned before, the “raw data” for a data set does not allow interpretation of the performance of a Web site. For this purpose two different online questionnaires were provided: one for the declaration of the expectations (importance rating) and the general assessment form for the evaluation of the different Web sites. The importance rating shows the expectation of a user for a certain criterion. If expectations are high, meaning that a certain feature is important for a Web site

from the user perspective, and cannot be found during the assessment the result will be a bad evaluation for the respective criterion. For the evaluation, the criteria are then summed up and aggregated to show only one value for a certain phase.

For an explanatory presentation of our results we picked www.webvan.com (the best practice profile). The following table shows the aggregated values for the consumer goods sector. The column labeled “importance” shows the perceived user expectations. The possible range of values is +2 to -2. For the calculation, the importance values are later transferred to a scale of 0 to 1. The final section is the most important followed by the after-sales and the information phase. The final section contains general criteria which apply to all phases (availability, user interface, interactivity, trust) and seems to be very important for consumer goods.

Phase	Results (Range -2/+2)	Importance	Company Profile		Best Practice Profile (BPP)	Sector Profile (SCP)
			Difference to			
			BPP	SCP		
1. Information Phase	3. 0.71	0.67	0.00	0.30	0.67	0.38
2. Agreement Phase	0.50	0.61	0.00	0.14	0.61	0.47
3. Settlement Phase	0.56	0.45	0.00	0.41	0.45	0.05
4. After-Sales Phase	2. 0.83	0.83	0.00	0.55	0.83	0.27
5. Community Component	0.17	-0.68	0.00	0.11	-0.68	-0.80
6. Final Section	1. 1.43	1.04	0.00	0.46	1.04	0.58
7 Overall Score	n.a.	0.49	0.00	0.33	0.49	0.16

Figure 11: Aggregated data set for the consumer goods sector, company profile: www.webvan.com

The community component received a very low importance rating. This could be due to the fact that the experts which we polled for the importance ratings did not think about the power of community building on the Internet as e.g. pointed out by Schubert [15]. Since personalization features enabled by the aggregation of customer profiles are not common on most Web sites (except on Amazon.com) customers know little about the community-enabled potentials in Web design. On the other hand, purchasing food and drugs might indeed not be an activity during which community-support is appreciated although examples could be recommendations, product ratings, aggregation of demand to lower prices, etc. [17].

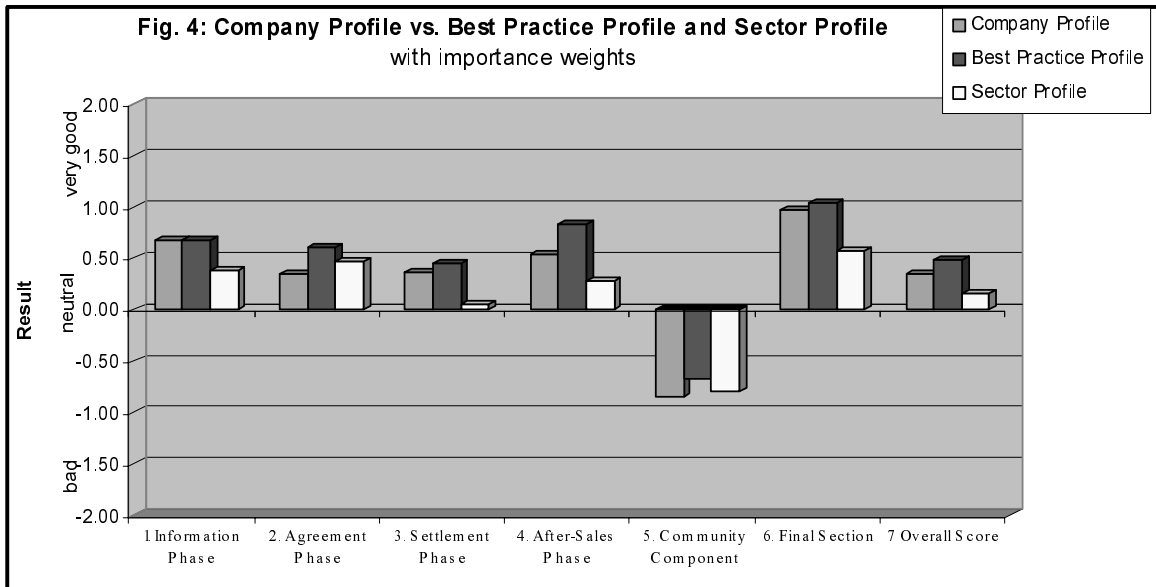


Figure 12: Company Profile of www.le-shop.ch

Figure 11 shows the company profile for www.le-shop.ch, the best Swiss Web site for consumer goods (second after the American company WebVan). As we can see, Le-Shop scored almost as high as WebVan in two of the three important sections, the final section and the information phase. There seems to be room for improvement in the after-sales phase and especially in the agreement phase which received a lower value than the sector average.

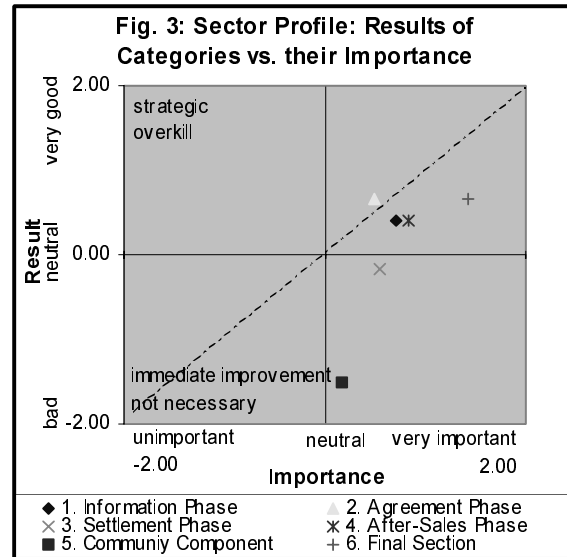
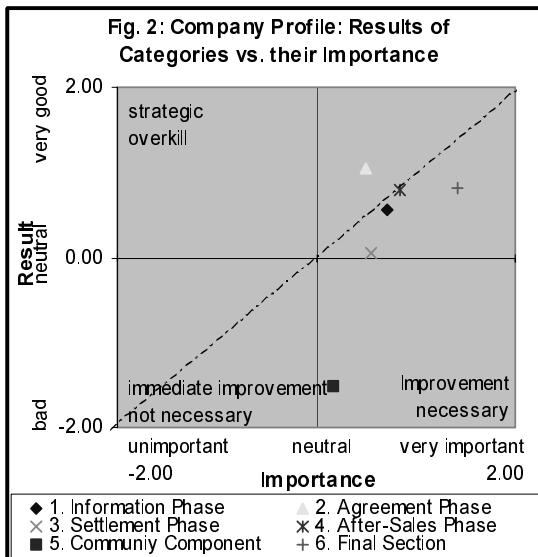


Figure 13: Company profile of www.le-shop.ch compared to sector profile of consumer goods sector

Figure 13 shows a comparison of perceived user expectations and assessment values. Table 1 contains recommendations for generic strategies which should be applied dependent on the results in the various sections.

Strategy	Results
<i>Strategic Overkill</i>	Entries in the upper left field indicate (very) good results in a (rather) unimportant category. Available resources are possibly not being applied effectively.
<i>Maintain Strategy</i>	Entries in the upper right field indicate (very) good results in (very) important categories.
<i>No immediate improvement necessary</i>	Entries in the lower left field indicate (very) poor results in (rather) unimportant categories.
<i>Improvement necessary</i>	Entries in the lower right field indicate (very) poor results in (very) important categories.

Table 1: Generic EWAM strategies

As we can see from Figure 13 www.le-shop.ch scored *higher* than the expectations in the category Agreement Phase. Interestingly, this is a category which were deemed unimportant for the consumer goods sector. The diagonal shows the points where expectations meet actual assessments. Most assessments for www.migros.ch are grouped around the diagonal. The general advice for www.migros.ch is to focus its future improvements on the settlement phase and the community component.

The aggregated results for all four companies (sector profile) show values which are lower than the individual ratings achieved by www.le-shop.ch. This is due to the fact that one of the companies, McFood, scored unusually low in all areas because it never really started operations (without telling the customer on the Web site).

Electronic Banking

Web sites assessed:

- <http://www.credit-suisse.ch> (best practice)
- <http://www.deutsche-bank-24.de>
- <http://www.ubs.ch>
- <http://www.bekb.ch>

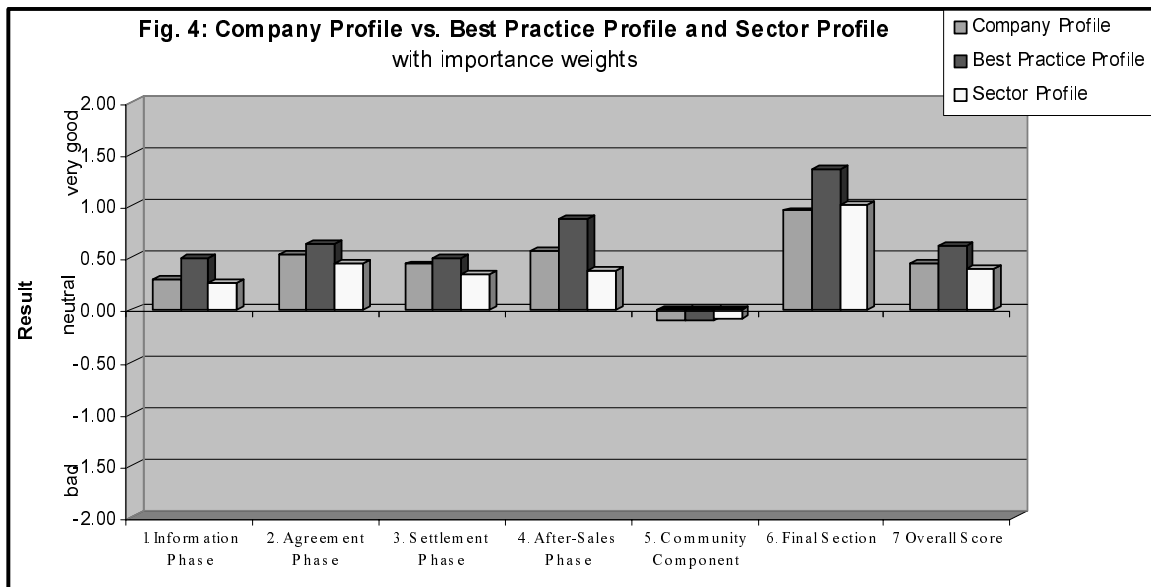
Credit Suisse and UBS are the two biggest banks in Switzerland. The Berner Kantonalbank (www.bekb.ch) is a small Swiss regional savings bank which, nevertheless, offers a comprehensive e-banking application. Bank-24 is the online venture of Deutsche Bank, the biggest bank in "Euroland". It was the first purely Internet-based bank in Germany. Deutsche Bank has a proactive Internet strategy – they were one of the few banks which launched a project with Ecash (which never really took off).

The e-banking sector resulted to be difficult to assess with the EWAM. Since most of our assessors did at most already use one of the selected e-banking services (who has more than one bank account?) they had to rely on the demo versions which are offered on all four Web sites. Credit Suisse was chosen to be best of its class in this sample. The results clearly state that the four Web applications are very similar to each other in terms of functionality, look and feel, contact possibilities, and so on. Figure 14 and 15 show the results for UBS as compared to Credit Suisse (best practice profile) and the general sector profile (aggregated values of all four banks).

Phase	Results (Range -2/+2)	Importance	Company Profile		Best Practice Profile (BPP)	Sector Profile (SCP)	
			Difference to				
			BPP	SCP			
1. Information Phase		0.13	0.30	-0.20	0.03	0.49	0.26
2. Agreement Phase		0.17	0.53	-0.11	0.08	0.64	0.45
3. Settlement Phase		3. 0.44	0.44	-0.06	0.10	0.50	0.34
4. After-Sales Phase		1. 2.00	0.57	-0.30	0.19	0.87	0.38
5. Community Component		-1.75	-0.11	-0.01	-0.03	-0.10	-0.08
6. Final Section		2. 1.62	0.95	-0.40	-0.06	1.35	1.01
7 Overall Score		n.a.	0.45	-0.18	0.05	0.62	0.39

Figure 14: Importance for the e-banking sector

The columns suggest that differences are almost negligible. What catches the eye are the almost zero values for the community category. Neither did the assessors attribute great importance to community (-1.75) nor did they report any kind of community-supporting components on the four Web sites. Interestingly, the after-sales phase seems to be of high interest. This is where the interaction between company and customer often relates back to the “real world”, namely to the telephone. Most after-sales services, such as the handling of complaints, are not processed via the Internet.

Figure 15: Company Profile of www.ubs.ch

Mathematical Derivation and Statistics

The following paragraphs introduce the mathematical basis of the EWAM tool as well as some basic statistics in order to investigate possible correlations between single criteria.

Mathematical Derivation

The following paragraphs describe the calculations for the comparison of any Web site examined with the average and with the best practice of this sector, including the importance rating of criteria, for the “Sector Profile”. The calculations for the “Company Profile” and “Best Practice Profile” are similar.

Criteria: X_i	Importance: W_i (Range -2 / +2)	Importance: Wg_i (Range 0-1)	Evaluation: \bar{r}_i (Range -2 / +2)	Weighted Value: R_i $R_i = Wg_i * \bar{r}_i$
X_1	W_1	Wg_1	\bar{r}_1	R_1
X_2	W_2	Wg_2	\bar{r}_2	R_2
...
X_{26}	W_{26}	Wg_{26}	\bar{r}_{26}	R_{26}

Table 2: Criteria X_i , Importance W_i & Wg_i , Evaluation r_i , Weighted Value R_i

The criteria ($X_i, i = 1..26$) are grouped in six categories ($K_k, k = 1..6$) according to the three transaction phases (information, agreement, settlement), the “After-Sales Phase”, the “Community Component”, and the “Final Section”

Categorie K_k	Description
K_1	1. Information Phase
K_2	2. Agreement Phase
K_3	3. Settlement Phase
K_4	4. After-Sales Phase
K_5	5. Community component
K_6	6. Final Section

Table 3: Categories K_1 - K_6

1. Transformation of the importance of a criterion

The evaluation of the individual criteria and their importance uses a scale from (-2) to (+2). To avoid the problem of the multiplication of two negative values, the importance of each individual criterion (W_i) is transformed into a range from (0) to (1) (Wg_i).

$$Wg_i = \frac{1}{4}(W_i + 2)$$

2. Average evaluation of each criterion

$$\bar{r}_i = \frac{1}{m} \sum_{j=1}^m r_{ij}$$

where

m = number of assessors evaluating a criterion X_i

r_{ij} = individual result of a criterion in range (-2/+2)

3. Multiplication of average result with importance rating

The definitive result for every criterion is arrived at by multiplying the average result of any criterion (r_i^j) with its importance rating (Wg_i). Thus a criterion only reaches the top score when the importance rating ($W_i = 1$) is top. With lower importance ratings ($1 \geq W_i \geq 0$) the final result of a criterion decreases, but does not fall below zero.

$$R_i = \bar{r}_i * Wg_i$$

4. Addition of the individual evaluations per category

The result for the category ($K_k, k=1...6$) is arrived at by adding the R_i per category. The example of the Information Phase (K_1) and the Agreement Phase (K_2) is given below.

$$K_1 = \sum_{i=1}^8 R_i$$

$$K_2 = \sum_{i=9}^{10} R_i$$

5. Calculation of the percentage attainment of top score for K_i

a) Calculation of the minimum (R_{MINi}) and maximum (R_{MAXi}) evaluation for a criterion with given importance in range (0-1).

$$R_{MINi} = Wg_i * -2 \quad -2 \leq R_{MINi} \leq 0$$

$$R_{MAXi} = Wg_i * 2 \quad 0 \leq R_{MAXi} \leq 2$$

b) Calculation of the minimum (K_{MINi}) and maximum (K_{MAXi}) evaluation for a category. The example given is for the Information Phase ($K_k, k=1$).

$$K_{MIN1} = \sum_{i=1}^8 R_{MINi}$$

$$K_{MAX1} = \sum_{i=1}^8 R_{MAXi}$$

c) Calculation of the percentage attainment of top score

$$K\%_k = \frac{(K_k + K_{MAXi})}{K_{MAXi} + (K_{MINi} * -1)} * 100 \%$$

simplified:

$$K\%_k = 0.5 \left(\frac{K_k}{K_{MAXi}} + 1 \right) * 100\%$$

6. Transformation of $K\%_k$ in a range (-2/+2)

In further analogies the result of a category (K_k) should be compared with its importance rating. Additionally the result $K\%_k$ is transformed in a range of (-2/+2) as the definitive result of this category (KR_k).

$$KR_k = \left(\frac{K\%_k}{100} * 4 \right) - 2$$

A value (e.g. 0.96, Information Phase- KR_1) in a range from (-2/+2) indicates that in the sector average the Information Phase has been evaluated by users as relatively good (evaluation scale: $KR_k = 1.0$ corresponds to 'good'). If the Web site examined shows a lower value, then it comes off comparatively worse in the Information Phase.

7. Comparison of the results of the individual categories (KR) with their importance ratings.

Calculation of the average value of the importance ratings of individual criteria (W_i) for a particular category (K_k). The Information Phase is given as an example:

$$KW_k = \frac{1}{8} \sum_{i=1}^8 W_i$$

8. Overall Score

The Overall Score is the final result of a profile (PR). It is calculated from the sum of the six categories (KS) in relationship to the theoretical maximum result of the respective profile.

a) Calculation of the sums of all categories (KS)

$$KS_o = \sum_{k=1}^6 K_k$$

where o (o= 1..3) indexes the three profiles.
(Sector Profile: o=1)

b) Calculation of the percentage attainment of the top score for KS

Calculation similar to 5c), but for all categories ($k = 1..6$). The percentage attainment of the top score of $KS\%_o$ is calculated with the following formula:

$$KS\%_o = \frac{(KS_o + RS_{MAXo})}{RS_{MAXo} + RS_{MINo} - 1} * 100\%$$

where RS_{MAXo} = The theoretical top score for all criteria in profile o

RS_{MINo} = The theoretical minimal score for all criteria in profile o

simplified:

$$KS\%_o = 0.5\left(\frac{KS_o}{RS_{MAXo}} + 1\right) * 100\%$$

c) Transformation of $KS\%_o$ in a range (-2/+2)

$$PR_o = \left(\frac{KS\%_o}{100} * 4\right) - 2$$

For the sector profile this results in a value of 1.02, which means “good” on the scale (-2/+2). The relevant interpretation is: “In this sector Web appearances are considered good within the sector average”.

Statistical Analysis

After some years of experimental research on the Extended Web Assessment Model we have finally reached a point of maturity where we decided to put the list of criteria to a statistical test. We used the assessment values described above to run some calculations in SPSS.

Consumer Goods

Figure 16 shows the summary of descriptive statistics for the retail sector. We included the assessment forms of 9 assessors for 4 different Web sites.

	N		Mean	Median	Mode	Std. Deviation	Range	Minimum	Maximum
	Valid	Missing							
evaluated site	36	0							
Web Page and Specific Offer are Easily Found	36	0	1,06	1,00	2	1,194	4	-2	2
Good Structure of Content	36	0	1,03	1,00	1	,845	3	-1	2
Reasonable Information Quantity	36	0	,61	1,00	1	1,293	4	-2	2
Quality of Content Meets User Expectations	36	0	,69	1,00	1	1,283	4	-2	2
Cost Benefits Passed on to the Client	35	1	,31	1,00	1	1,530	4	-2	2
Bundling: Good Combination Possibilities for Products/Services	33	3	,06	1,00	-1 ^a	1,499	4	-2	2
Good Recommendation Systems	27	9	-,22	-1,00	-1 ^a	1,423	4	-2	2
Adequate Application of Hypermedia	25	11	-,44	-1,00	1	1,356	4	-2	2
Transparent and Interactive Design of Ordering Process	35	1	,86	1,00	1	1,115	4	-2	2
Fair and Individual Prices	36	0	,50	1,00	1	1,207	4	-2	2
Easy Selection and Good Integration of Generic Services	36	0	,31	1,00	1	1,431	4	-2	2
Good Integration in Customer's IT-Infrastructure	28	8	-,61	-1,00	-2	1,524	4	-2	2
Good Tracing and Tracking	31	5	-,29	-1,00	-2 ^a	1,532	4	-2	2
Convenient Customer Support	33	3	,36	1,00	1	1,319	4	-2	2
Satisfying Customer Support	27	9	,19	1,00	1	1,469	4	-2	2
Good Access to Community	12	24	-1,67	-2,00	-2	,888	3	-2	1
Good Quality & Quantity of Relationships in Community	11	25	-1,73	-2,00	-2	,905	3	-2	1
Good Quality & Quantity of Content Generated by Community	12	24	-1,75	-2,00	-2	,866	3	-2	1
Purchasing Power	18	18	-1,28	-2,00	-2	1,127	3	-2	1
Good Availability	36	0	,56	1,00	2	1,557	4	-2	2
Good User Interface	35	1	,83	1,00	1	1,248	4	-2	2
Improvement in Productivity / Time Gained	36	0	,64	1,00	1	1,246	4	-2	2
Interactivity	36	0	-,19	-1,00	-1	1,327	4	-2	2
Good Contact Possibilities	35	1	,37	1,00	1	1,262	4	-2	2
Trustworthy Business Partners	35	1	,74	1,00	1 ^a	1,400	4	-2	2
Trust in Internet as Platform and Legal Situation	36	0	1,31	1,00	1	,749	4	-2	2

a. Multiple modes exist. The smallest value is shown

Figure 16: Summary of descriptive statistics for the retail sector

There are a couple of conclusions which we can draw from the table. The criterion “Good Structure of Content” was the only one which never showed the minimum value. So, obviously, even the worst Web site (McFood) was at any rate somehow sensibly structured. The community aspect was answered only by roughly a third of all assessors. Furthermore, there was no perfect access to a community on any of the Web sites. There was no site with very good quality and quantity of the relationships in the community. Neither was there a site with very good quality and quantity of content generated by a community. None of the companies gathered very strong purchasing power. Most criteria distributions have a long left tail with significant negative skewness indicators (i.e. a skewness value more than twice its standard error). Generally, the assessors showed a high confidence in the legal situation of the Web sites (highest mean 1.31) with the lowest standard deviation and variance. This is not surprising since the Web sites were chosen and recommended by the course instructor and thus per se trustful for the students.

There are some criteria which we suspected to have a strong correlation. In order to test our assumption, we performed a hypothesis testing with selected criteria. For this article, we picked some examples to illustrate our findings. In the first example we tested the goodness of fit for the two first criteria of the

information phase “Web Page and Specific Offer are Easily Found (eou1)” versus “Good Structure of Content (eou2)”.

Web Page and Specific Offer are Easily Found				Good Structure of Content			
	Observed N	Expected N	Residual		Observed N	Expected N	Residual
very hard to find, very hard to remember	2	9,0	-7,0	poor structure of content	4	12,0	-8,0
hard to find, hard to remember	4	9,0	-5,0	good structure of content	23	12,0	11,0
easily found, easy to remember	14	9,0	5,0	very good structure of content	9	12,0	-3,0
very easily found, very easy to remember	16	9,0	7,0	Total	36		
Total	36						

Test Statistics		
	Web Page and Specific Offer are Easily Found	Good Structure of Content
Chi-Square ^{a,b}	16,444	16,167
df	3	2
Asymp. Sig.	,001	,000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 9,0.
b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 12,0.

Figure 17: Testing the goodness of fit for eou1 and eou2

Results for “**eou1**”: The sites are in a majority easily found and very easily remembered. There are far more positive responses than expected (+5, +7). The same holds true for “very hard to find” and “hard to find”, but with negative signs. Results for “**eou2**”: The sites provide good content (+11 than expected). Very few people answered with poor structure (-8) and few people said they have very good structures (-3) than expected.

Hypotheses testing

Results for “**eou1**”: For a significance level of 0.01 we were able to reject the null hypothesis because $16.444 > 11.345$. There is enough sample evidence to reject the assumed equal distribution (25% each). Results for “**eou2**”: For a significance level of 0.01 we could reject the null hypothesis because $16.167 > 9.210$. There is enough sample evidence to reject the assumed equal distribution (33% each).

In a second example we looked at the independence of “Cost Benefits Passed on to the Client (usef2)” and “Fair and Individual Prices (usef6)”. The concept of “price” which is contained in both descriptions suggests that there could be a dependence. From the point of view of the EWAM, there is a big difference between the two factors. The first one relates to discount prices for *every customer alike* granted by the operator of the platform because of lower cost (no physical store, low stocks, less employees, etc.). The second criterion refers to fair prices for *individual* customers depending on their customer profile (big companies with high order volumes versus customers placing occasional orders). Although the two criteria are different in nature they showed a high interrelation.

Directional Measures			Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	,579	,090	4,781	,000
		Cost Benefits Passed on to the Client Dependent	,673	,086	4,781	,000
		Fair and Individual Prices Dependent	,509	,105	4,781	,000

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Figure 18: Directional measures for “usef2” and “usef6”

The low significance values for Somers' d (0,000) indicate that there is a relationship between the two variables. Since the values are positive and fairly big ($> 0,5$), we assumed that there is a positive relationship between usef2 and usef6.

We will perform further tests on such interdependencies between variables in future studies. If criteria prove to be dependent in other sectors, we will try to further clarify the differences in optimized descriptions. If dependencies reside, we will think about eliminating such redundancies by revising the list of criteria. For space limitations the statistics of the E-Banking sector were not included in this article.

Discussion of Findings

The following two paragraphs talk about the underlying assumptions of the findings as well as possible limitations to their generalizability.

Underlying Assumptions

Web assessment is a very ambitious and labor-intensive work. The assessors have to meet certain criteria:

- They need to understand the criteria of the Web assessment form very well, hence they must undergo a thorough instruction
- They must be experienced Web users
- They must take the time to go through all four transaction phases for each Web sites assessed (including delivery and payment!)

The two sectors which we put to the test were not equally well-suited to be assessed with the tool. The Web assessment method is based on the four transaction phases of a typical purchase. Thus, e-banking is difficult to test with the existing categories. Nevertheless, we still think that it is possible to evaluate almost any kind of Web site since most of the criteria refer to Web site functionality and not purely to the process.

The e-banking sector shows homogeneous Web applications which do not differentiate themselves from the competition. This is not surprising since banking applications are quite generic and involve little personal involvement on the part of the user.

The consumer goods business is a local business – even on the Internet. This is quite evident because of the nature of the products (have to be physically delivered, are prone to spoil or break). It is even more surprising, that the Web sites selling consumer goods seemed to be very mature. The services were found

to be quite reliable, the problems of cooperation with logistics partners have been solved satisfactorily. Some complaints were the limited range of products (e.g. frozen food is not available) or the missing link to the inventory (availability check). Some orders arrived with missing items because they had been out of stock at the time when the package was prepared.

Generally, it seems that few Internet merchants have ever tried to assess their Web sites from a consumer perspective. Most are still driven by technical possibilities. It is noticeable that there is a missing link to “traditional” information systems, e.g. an existing ERP, which could help to perform an availability check which is crucial to an online transaction. Most systems seem to be stand-alone Web applications. This can be either due to the consideration of security (a bad reason from the customer perspective) or due to the high cost of integration of the different systems.

Possible Restrictions to Interpretation

The author is aware that the empirical study with a sample set of 20 expert opinions can only reflect a limited and somehow biased picture of current practice in the two sectors. The bias exists because the students share similar opinions of e-commerce and are a homogeneous group (because they attended the same E-Business class, their opinions tend to be less universal than if they were hand picked at random). For e-commerce as a whole, 20 people from Switzerland are not representative of the thousands of Web users in Switzerland’s B2C field. Nevertheless, since the EWAM is a very knowledge-requiring process we cannot ask a random sample of people to do the assessments.

The Web sites chosen for evaluation were not very diverse. Only four companies per sector were chosen. Nevertheless, we would like to state that the number of serious players in the online world is still limited. In the physical world there are hundreds of companies that belong to the retail and banking sector – on the Web, nevertheless, it took us a week to find four Web companies for each sector that were suited for testing.

Conclusions

In its origins, EWAM is one of the oldest evaluation methods of its kind. It has been revised and improved a couple of times. EWAM lays down a conceptual framework for the evaluation of commercial Web sites whose basic form – the Web Assessment Method – has already proved itself in operation for several years. With the new EWAM, this work is placed in the context of current developments in e-commerce and united with an established scientific model (the TAM). Web sites can thereby be thoroughly appraised and implicitly the degree of customer orientation can be judged. An important improvement was considering the importance of a criterion for a specific business sector which led to a more differentiated assessment of Web sites in different industries.

After four years of development, EWAM has finally been launched as a tool for teaching and consulting. We are currently gathering data for requested sectors trying to set up a quantitatively and qualitatively sufficient database of assessments and importance ratings. Our findings show that a high-quality Web service (seen from the customer perspective) does not always correspond to a commercially successful company. WebVan – as a best practice example – shows that over-ambitious management intentions can lead to the failure of the business. Therefore, the soundness of the business model and the assessment of the Web site have to be analyzed separately. EWAM can only support the evaluation of the implemented customer interaction but gives no advice on managerial aspects. Further success factors such as the integration of the supply chain, the linkage of in-house information systems or the consideration of financing

and yield aspects are excluded from the present version. The combination of these aspects would be an all-embracing model for the evaluation of integrated e-business solutions in companies.

Acknowledgements

Many people have worked on the Extended Web Assessment Method throughout the past years. The author of this article would like to attribute special thanks to the researchers involved in the work on the method itself (most importantly the underlying criteria catalog) and the automated tool.

In St. Gallen, I worked on the original Web Assessment Method with my colleague Dorian Selz who co-authored the first article in 1997 for the EM Journal. The members of the Electronic Markets team (CC EM) at the mcm institute (under guidance of Prof. Dr. Beat Schmid) discussed the first ideas with the industrial partners of the competence center.

In the year 2000, the Web Assessment Method was completely revised and extended at the University of Applied Sciences in Basel. Under my supervision, Adrian Giger did a great job in his master thesis, adding the importance ratings and programming the software tool. The latest changes have been added by Uwe Leimstoll who assumed responsibility for further improving the method and for offering EWAM as a consulting service for companies. Our SPSS expert, Barbara Sigrist, performed the statistical analysis outlined in a special chapter of this article. I would also like to give special thanks to Walter Dettling who contributed to a pre-version of this paper for HICSS 2002 [16].

I am also indebted to a student class who – within the scope of their executive training on E-Business at the University of Applied Sciences Basel – contributed the data to this research paper. Another contribution was made by a student group, Jon Burdette, Juliane Kloubert and Kurt Lischeid, who, under the supervision of Prof. Dr. Claudia Löbbecke (University of Cologne), analyzed a previous EWAM study from January 2001 and supplied us with their constructive feedback.

References

1. Davis, F.D. Jr. (1985): A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results. Doctoral Thesis, Sloan School of Management, Massachusetts Institute of Technology, 1985.
2. Fishbein, M., and Ajzen, I. (1975): *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley, 1975.
3. Giger, A. (2000): *Erweiterte Web Assessment Methode – Beurteilung von E-Commerce Applikationen aus Kundensicht*, Master Thesis, University of Applied Sciences (FHBB), Basel, 2000.
4. Giger, A., Schubert, P., and Dettling, W. (2001): *EWAM – Erweiterte Web Assessment Methode: Beurteilung von E-Commerce Applikationen aus Kundensicht*, Basel: Working Report No. 3, E-Business Competence Center, University of Applied Sciences, Basel (FHBB), January 2001.
5. Gomez Advisors, Inc. (2000): [<http://www.gomezpro.com/index.asp>], [accessed 2000/08/16].
6. Helft, M. (2001): Reality Check, Aisle 5, in: *The Standard*, [<http://www.thestandard.com/article/0,1902,24035,00.html?nl=dnt>], 2001/04/30. [accessed 2001/06/10].
7. JurisNET GmbH (2000): *JurisNET-Gütesiegel*, [<http://www.jurisnet.ch>], [accessed 2000/08/10].

8. Kamenz, U. (2000): Perfekte Webseiten - wie sieht die Realität aus, in: Pfürtsch, W.A. (ed.), *Living Web: Erprobte Anwendungen, Strategien und zukünftige Entwicklungen im Internet*, pp. 21-33, Landsberg: verlag moderne industrie, 2000.
9. Kammerer, K. (2000): Community in Action: www.hauptversammlung.de, in: Pfürtsch, W.A. (ed.), *Living Web: Erprobte Anwendungen, Strategien und zukünftige Entwicklungen im Internet*, pp. 73-84, Landsberg: verlag moderne industrie, 2000.
10. Klein, S. (1998): Konzepte und Vorgehensmodelle für die Web-Evaluation, in: Korte, W.B., and Reinhard, U., *who is who in electronic commerce*, pp. 200-209, Heidelberg: whois verlags- und vertriebsgesellschaft, 1998.
11. Liu, C., Arnett, K.P., and Litecky, C. (2000): Design Quality of Websites for Electronic Commerce: Fortune 1000 Webmaster's Evaluations, in: *The International Journal of Electronic Commerce & Business Media*, Vol. 10. No. 2, pp. 120-129.
12. Malhotra, Y., and Galletta, D.F. (1999): Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation, in: *Proceedings of the 32nd Annual Hawaii International Conference on System Sciences*, 1999.
13. Parasuraman, A., Zeithaml, V., and Berry, L. (1988): SERVQUAL: A Multi-item Scale for Measuring Consumer Perceptions of Service Quality, in: *Journal of Retailing*, Vol. 64, 1 (1988), pp. 12-40.
14. Platoni, K. (2001): The Last Mile, in: *Eastbay Express Online*, [<http://www.eastbayexpress.com/issues/2001-05-25/feature.html/page1.html>], 2001/05/25. [accessed 2001/06/10].
15. Schubert, P. (2000): The Participatory Electronic Product Catalog: Supporting Customer Collaboration in E-Commerce Applications, in: *EM – Electronic Markets (The International Journal of Electronic Commerce and Business Media)*, Vol. 10, No. 4, 2000.
16. Schubert, P., and Dettling, W. (2002): Extended Web Assessment Method (EWAM) – Evaluation of E-Commerce Applications from the Customer's Viewpoint, in: *Proceedings of the 35th HICSS Conference, Hawaii*, 2002.
17. Schubert, P., and Ginsburg, M. (2000): Virtual Communities of Transaction: The Role of Personalization in Electronic Commerce, in: *EM – Electronic Markets (The International Journal of Electronic Commerce and Business Media)*, Vol. 10, No. 1, 2000.
18. Schubert, P., and Selz, D. (1999): Web Assessment – Measuring the Effectiveness of Electronic Commerce Sites Going Beyond Traditional Marketing Paradigms, in: *Proceedings of the 32nd HICSS Conference, Hawaii*, 1999.
19. Schubert, P., and Selz, D. (2000): Measuring the Effectiveness of Electronic Commerce Websites with the Web Assessment Method, in: Hunt, B. (ed.), *E-Commerce and V-Business*, London: Imperial College, 2001.
20. Selz, D., and Schubert, P. (1997): Web Assessment – A Model for the Evaluation and the Assessment of Successful Electronic Commerce Applications, in: *EM – Electronic Markets (The International Journal of Electronic Commerce and Business Media)*, Vol. 7, No. 3, 1997, pp. 46-48.
21. Selz, D., and Schubert, P. (1998): Web Assessment - A Model for the Evaluation and Assessment of successful Electronic Commerce Applications, in: *Proceedings of the 31st HICSS Conference, Hawaii*, 1998.

22. Spiliopoulou, M. (2000): Web Usage Mining for Web site Evaluation, in: Communications of the ACM, August 2000, Vol. 43, No. 8, pp. 127-134.
23. Totz, C., Riemer, K., and Klein, S. (2001): Web Evaluation, in: Lowry, P.B., Cherrington, J.O., and Watson, R.R. (eds.), The E-Business Handbook, pp. 45-66, Boca Raton: St. Lucie Press, 2001.
24. Van der Heijden, H. (2000): The Impact of Perceived Website Characteristics on Website Traffic, in: Proceedings of the 13th International Bled Electronic Commerce Conference, Bled, Slovenia, 2000.
25. Zhang, P., and von Dran, G. (2001): Expectations and Rankings of Website Quality Features: Results of Two Studies on User Perceptions, in: Proceedings of the 34th HICSS Conference, Hawaii, 2001.

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