

# Development of Online Services under Time Critical Conditions

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## Abstract

The Internet has dramatically increased the possibilities for media product development. This is becoming a key factor for media companies specialized in managing and distributing information, as high demand for online services has pushed media companies to release their products faster. This study explores an iterative model for development of web products, and compares this model to conventional media products and software industry. Two Finnish news sites were analyzed from the perspectives of their content, structure, and working routines. Then, a new online service was designed and evaluated by four internal test groups. The study shows that creating value added web sites for high performance is a complex operation; it requires technical software tools and co-operation between people with different skills and background. Working with digital online products offers the development team several benefits e.g. inexpensive prototyping and multiple iteration loops.

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## Background

The heavy competition within the media industry has pushed the media companies to release new online products and services in a faster tempo. The news web sites are strongly influenced by journalistic reporting style of the printed newspaper [Turpeinen, 1999]. Unlike traditional media channels like newspaper, television and radio, the Internet can offer media consumption in different rhythms. The World Wide Web can simultaneously display simple text, searchable database services and real time news with text, audio and moving images. However, there has been little studies on the production process of online services and comparisons of web development with traditional media and other information-oriented industries.

Despite the possibilities of the Internet, a significant proportion (over 60 percent) of online service subscriptions have been discontinued because of dissatisfaction with the service and low switching costs to similar other services [Parthasarathy, 1998]. Therefore, there is a constant need for media companies to (1) increase the quality of the web site, and (2) to create products which generates closer relationships with the consumer in order to increase the service's switching cost.

This paper introduces a model for development of online services. Finland's first web site for an evening newspaper and the leading financial news web site were first analyzed. A new online service called Live Index was created in cooperation with Alma Media Corporation. This made it possible to evaluate different working methods for web development. Live Index combines some of the qualities of traditional media journalism with new possibilities of the online environment. However, the primary goal was to explore a model for generation of online services, not the nature of Live Index as a potentially interesting new product.

In mature industries such as the automotive industry, the traditional models for product development emphasize a sequential approach in order to avoid unnecessary changes. This is possible when the product has well defined concepts and specifications. However, in uncertain environments, the product development process has to be less rigid [Nellore, 1999]. An effect of this in software development is that requirements are becoming more unstable in order to achieve shorter lead times and faster reactions to changing markets. The primary risk with this approach is that the project is built on a moving baseline, something that is often referred to as a reason for project failure [Ebert, 1999]. Still Bradley and Nolan argue that in the network era the radically faster, real-time, "sense and respond" strategies will replace the traditional "make and sell" strategies [Bradley and Nolan, 1998]. Also Iansiti argues that in the Internet world, knowledge obsolesces fast and this makes experimentation the centerpiece of all development efforts [Iansiti, 1998].

Thus, much like software, online service products are often one-of-a-kind. However, software developers must find a development approach that is less definitive in order to be open for other software projects. Designed and developed components must be flexible and constructed in such a way that they can be used in future applications [Pittman, 1998]. According to Christensen the elements most salient to a company's survival are architectural in character: they are the concepts that define how the components within the product interact or relate to one another [Christensen, 1998]. Technical specifications and documentation are in general more required when developing software components compared to online products, since software developers live longer with their products. On the other hand, in the media industry it is more a one shot effort. Working routines and fixed templates facilitate providing the media market quickly with short life cycle products.

The literature describes several development life cycle models for different types of software projects [McConnell,1996]. According to McConnell the pure waterfall model progresses a project through an orderly sequence of steps from the initial concept through system testing. The phases are discontinuous and therefore do not overlap. The model performs well for stable product definitions but is not applicable when there are difficulties in fully specifying the requirements at the beginning of the project. A model that functions better in changing conditions, though complicated to manage, is the spiral model, which is a risk-oriented life cycle that breaks a software project into mini projects. Each mini project addresses a risk, e.g. poorly understood requirements or potential performance problems. When the major risks have been addressed the spiral model terminates as a waterfall life cycle. A useful model when requirements are changing rapidly is the evolutionary prototyping. It starts developing the most visible aspects of the system. It produces steady visible progress which is appreciated when there is a strong demand for development speed or when the customer is reluctant to commit to a set of requirements. The disadvantage is that we do not know at the start how long it will take to create an acceptable product [McConnell,1996].

McConnell argues that there is no such thing as a "rapid development life cycle model". Instead each model should be used in a context where it performs best [McConnell,1996]. On the other hand, Porra argues that traditional development models of a life cycle limit themselves to a birth-and-death cycle [Porra, 1999]. Porra concludes that prototyping involves more than the first-of-a-type product development. A digital product must not only be designed for iterative improvement, it must also provide a mechanism to alter the business concept itself.

## Method

The research project was carried out at Alma Media Corporation in Finland between June 1998 and June 1999. Two of their online services, Iltalehti Online, Finland's first evening newspaper online service and Kauppalehti Online, Finland's leading financial online news service, were selected for the first analysis.

- The structure, working routines and characteristics of the two online services were analyzed. We used open-ended interviews with 14 key people to understand how the two online services worked on a daily basis and how the new ideas and concepts had come about. Both online services have been in operation since the middle of the 1990s. Despite the fact that these online services have had a different focus and web approach, they represent two interesting cases for our study. Since it started the financial online news service has been continuously updated, developed and it has expanded its service. The evening newspaper online service has on the other hand made minor changes to its interface layout and web concept since it started in 1995. Nevertheless, the online service has been highly popular with its easy-to-read, basic structure and simple functionality.
- We created, in co-operation with Alma Media Corporation, Live Index, an online news service. Live Index became a test bench to try out journalistic ideas for online services and elaborate on ways of working in order to achieve the described development process.
- Live Index was evaluated by four test groups in order to analyze the structure, functionality and development process. Due to copyright issues the evaluation phase was done internally at Alma Media Corporation. The test groups were divided into four categories. Test group one consisted of the seven people involved in the development of Live Index. Test group two consisted of key people at Iltalehti Online and Kauppalehti Online. Test group three consisted of all echelons at Alma Media Corporation with access to Internet. Test group four consisted of 12 professional online users that also had journalistic experience.

An online questionnaire for each test group was made accessible on the Live Index site. The test groups were given a first section of 11-15 multiple-choice questions related to functionality and structure of Live Index. For the more experienced online users there was a second section with 12 questions, which elaborated on the web site concept and its features. The development group was given a questionnaire with 15 questions concerning the working methods, development tools and teamwork. To a certain extent the authors were involved in the development group. It was fruitful to have been an insider rather than an outsider in order to gain a feeling for the development process. The questionnaires were limited to less than 30 questions so that they could be answered within one hour. For each launched version the goal was to make the

questionnaire more specific so that it was clear how the modifications should be made in the next iteration.

## **Results**

The results section consists of two parts. The first part describes the Live Index online service, while the second part starts by describing the structure, working routines and characteristics of Kauppalehti Online and Iltalehti Online and then continues to describe the applied development process for Live Index.

### **The test bed**

*Dynamic business environments are information-rich by their nature. A higher frequency of change creates larger volumes of information that need to be communicated, processed, and ultimately translated into decisions* [Medelson, 1998]. For the online consumer the continuous stream of information is not manageable on the screen if it is not structured according to personal preferences, classified by category and theme. The process of selecting events and transforming them into news is time and quality critical. Much like software development is often considered as an art [Pittman, 1998], journalistic work is a creative process. According to Jonsson, success in an online service depends as much on narrative skills as on the available bandwidth capacity [Jonsson, 1998].

The idea of Live Index was to display several media channels through one single interface. The online service had three main functions. First, news in text, image and streamed video was displayed. Second, themes were built up with different journalistic viewpoints. Third, the online service was run by a web-dj, a journalist that selected and structured information from other media channels to the Live Index site. The web-dj's task was to run the Live Index web site with his/her personal rhythm and touch. The web-dj guided the consumer through the media buzz and encouraged the consumers to participate in the discussions. An online service with frequent hits could generate several potential consumers willing to discuss and contribute ideas. The interaction with the consumers was thought to generate interesting content.

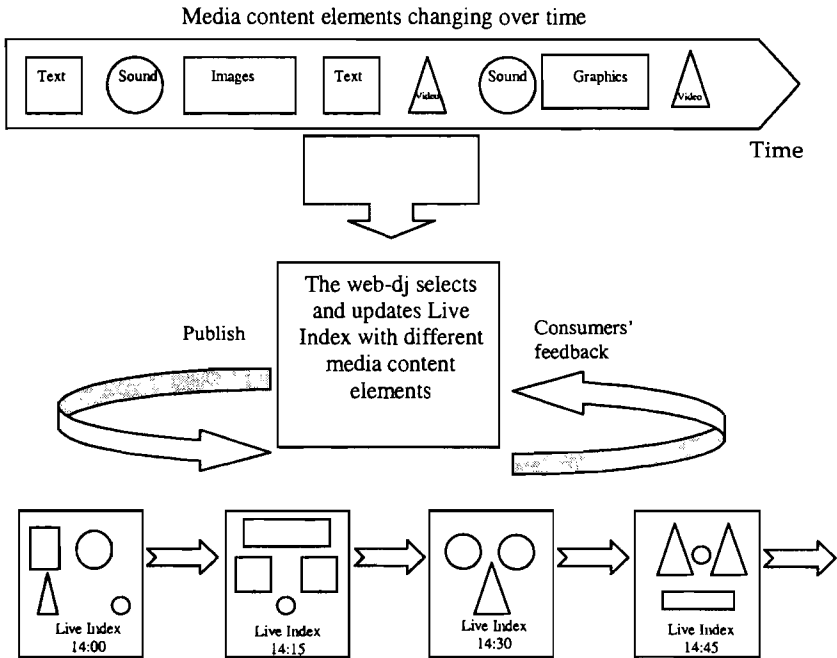
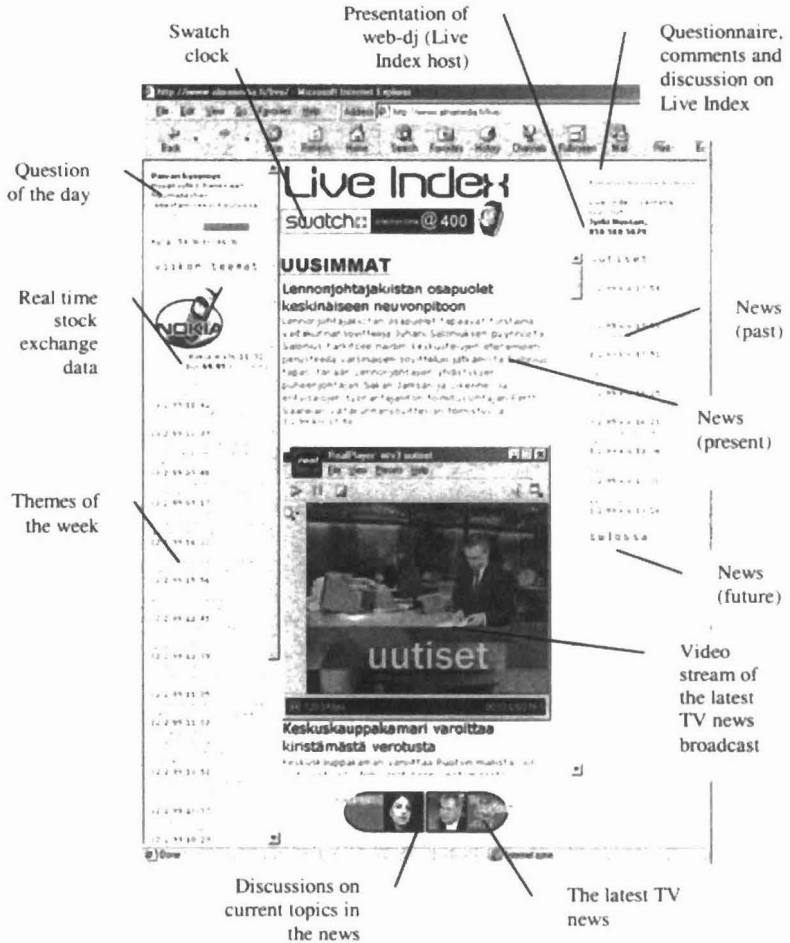


Figure 1. The original Live Index concept displays several different media content elements through one interface.



	Day 1	Day 2	Day 3	Total
Theme Nokia	13	9	4	26 articles
Theme Communicating Toys	6	1	0	7 articles
Voting Questions	1	1	1	1 new questions / day
News	44	84	49	177 articles
Opinion				9 writings
TV News				9 times

Figure 2. The image shows the fourth iterated version of Live Index. The consumer was served structured information from several media channels through one interface during the 3-day test period. The table shows the media content elements used during the 3-day test period.

### **Theme concept**

The information on Live Index was classified and structured into categories, themes and pointers. The pointers were paragraphs or links to news from an arbitrary number of other media products. A theme could consist of a number of articles, or it might also be a combination of short paragraphs or hyperlinks that cover an event. The event can cover different categories. The combination of familiar features of newspapers, TV, radio, and magazines could be put together in web-based hypermedia news. Skilled editors could combine a news story with background information from their own sources in the news organization, as well as hyperlinks to carefully selected outside sources. A news article on the site can thus become a gateway to exploring the underlying theme of general interest, by providing both more depth and breadth to the news content [Turpeinen, 1999]. The themes from Live Index were updated continuously by the present web-dj during the 3-day test period. Two themes were presented: "Communicating gadgets" and "Nokia", which were built on three sub-themes: (1) current technology and cutting-edge research. Articles on new hardware, design and crazy projects, 2) the future of Nokia and the telecommunication industry. Articles on the new economy, globalization and Finland, and 3) impact on everyday life and work, with questions like: "Can I keep my job?" and "Will I need friends any more?" The web interface was built on three modular sections. The left column (see Figure 2) displayed features such as: the question of the day, real time stock exchange and the theme of the week. In the middle column under the Live Index logotype, the Swatch Internet time was displayed [Swatch, 1999]. Underneath, two fixed modules were positioned below each other to display selected texts (present news) and streamed video. At the bottom there were navigating buttons for discussion topics and TV news. In the right column there were two modules showing past and future news. At the top of the column a brief presentation of the web-dj was shown. At the very top of the column was a link to a questionnaire to evaluate the web site.

### **The Live Index Development process**

In this section the lessons learned from the developing process of the Live Index site are described. The Live Index development process followed a set of iteration loops in sequence. The iteration loops were brainstorming sessions in a high tempo. Each loop started with an evaluation of the previous product version and finished by launching the next modified version. Brainstorming was frequently used in many roles, either to develop new concepts or find critical points of the concept. Multiple iterated loops made it possible to keep the design constraints open as long as possible in the development process and be able to introduce adjustments "on the fly". Time to reflect and document these sessions was an important development step in itself. Documentation of ideas, concepts and experiences throughout the project facilitated efforts to recapitulate what had been achieved and therefore also made it possible to reduce the development time. Documentation might seem time-consuming, but instead it saved time and also helped to clarify potential development risks. Each iteration



loop would take the development process one step further. Despite documentation and shared visions in the development group, one should not underestimate the necessary time to transfer the concept to those people engaged in software programming, web design and web site maintenance. A lack of communication created in our case a misinterpretation of the web-dj concept.

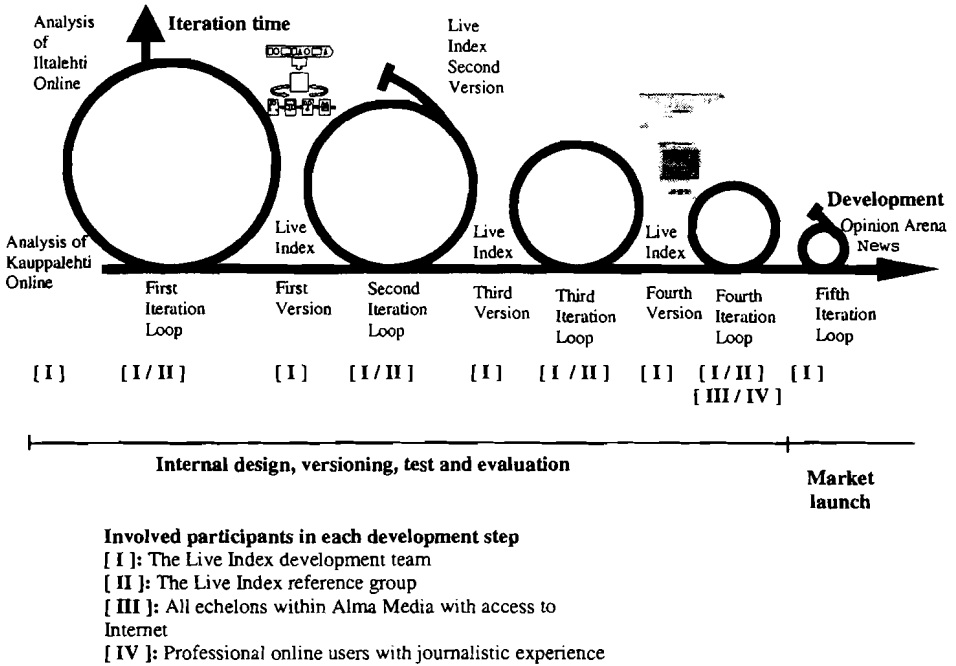


Figure 3. The figure shows the development process of the Live Index project.

### Analysis

The development process of Live Index started with an analysis of Iltalehti Online and Kauppalehti Online during one month. The purpose was to understand the present working methods, features and design of these online services.

## KauppaLehti Online

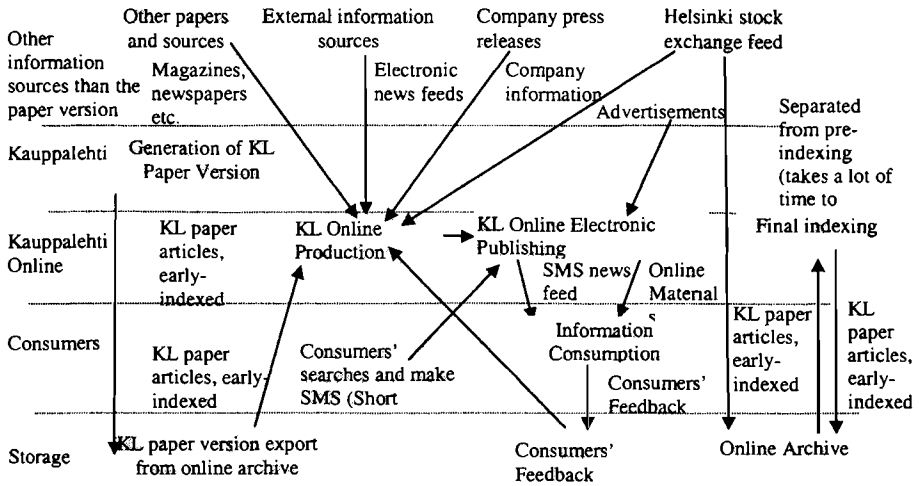


Figure 4. The chart shows an overview of the KauppaLehti Online production. The table contains a condensed overview of the analysis results.

KAUPPALEHTI ONLINE	
<b>THE KAUPPALEHTI BRAND</b>	
<ul style="list-style-type: none"> <li>The journalistic style is targeted for professionals of financial information.</li> <li>Compete on the local and domestic market.</li> </ul>	
<b>KAUPPALEHTI ONLINE PRODUCTION</b>	
<ul style="list-style-type: none"> <li>KauppaLehti Online is published five days a week, weekdays only.</li> <li>KauppaLehti Online provides different packages from distribution of the printed edition in electronic format to real-time information on stocks and focused financial news for professional users.</li> <li>24-hour service, production deadlines run all the time.</li> <li>News is shown through: flashes or longer articles.</li> <li>Four journalists work at the news desk.</li> <li>One supervisor works full time and three journalists shift between the paper version and the online version. One journalist follows the Helsinki stock market and two journalists follow the other financial markets. Phone calls to market contacts are frequently used to check effects of different market activities.</li> <li>The journalists do not need delegation. They act independently.</li> </ul>	
<b>KAUPPALEHTI ONLINE ELECTRONIC PUBLISHING</b>	
<ul style="list-style-type: none"> <li>The advertisements and the content are displayed through the KauppaLehti online electronic publishing software.</li> </ul>	
<b>FINAL INDEXING</b>	
<ul style="list-style-type: none"> <li>The KauppaLehti paper edition is indexed. One archivist works full time.</li> </ul>	

## OTHER INFORMATION SOURCES THAN THE PAPER VERSION

### OTHER PAPERS AND SOURCES

- Newspapers, magazines etc.

### EXTERNAL INFORMATION SOURCES

- Electronic news feeds, e.g. Bloomberg, Reuters etc.

### COMPANY PRESS RELEASES

- Company information.

### HELSINKI STOCK EXCHANGE FEED

Online data feed in numbers

## KAUPPALEHTI

### GENERATION OF KAUPPALEHTI PAPER VERSION

- Published five days a week, weekdays only.
- Kauppalehti paper version uses Kauppalehti Online as an internal news desk.

## CONSUMERS

### INFORMATION CONSUMPTION

- Target group: Investors
- Customer-dependent operations

### CUSTOMERS SEARCHES AND MAKE SMS REQUESTS

- SMS-feed generated for mobile users.

## STORAGE

### CUSTOMER FEEDBACK

- The feedback from the readers is transferred via e-mail.

### ONLINE ARCHIVES

- Systems used for archiving Kauppalehti material

KAUPPALEHTI PAPER VERSION IS EXPORTED FROM ONLINE ARCHIVES

## JOURNALISTIC GUIDELINES FOR KAUPPALEHTI ONLINE

"Do not try to please everybody, only the customers who are professionals."

- Financial online news needs to be quick, precise and catch the core of the news.
- There is a journalistic drive to publish news fast with both a content and a context quality.
- Data is double checked along with professionals.
- Reliable sources are used.
- Routines reduce the risk of errors.

## Italehti Online

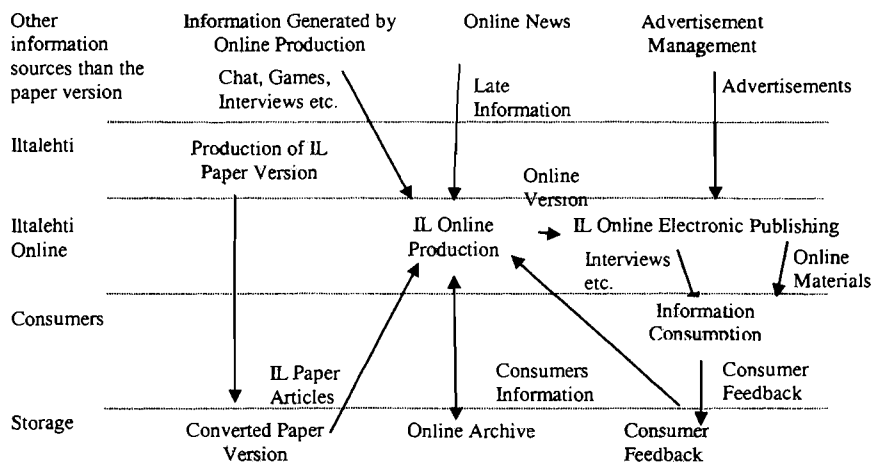


Figure 5. The chart shows an overview of the Italehti Online operation. The table contains a condensed overview of the analysis results.

<b>ILTALEHTI ONLINE</b>
<ul style="list-style-type: none"> <li>• The Online version is published six days a week except Sundays.</li> <li>• 70-80% of the paper version is transferred to the Online version.</li> <li>• Italehti Online consists of eight sections - opinion, news, people, sports, leisure, pop&amp;rock, readers and information. 40% of the Online version consists of pictures.</li> <li>• One journalist is occupied four hours with Italehti Online, from 7 am. to 11 am. Two hours is journalistic work, the remaining time is web production.</li> <li>• The Online journalists have to have all-round skills.</li> <li>• Six different software programs were used for the online production.</li> <li>• Current working steps at Italehti Online are: layout, selecting articles, linking front page to story, linking stories to stories, verification test about 30 min., rewriting captions, add pictures.</li> </ul> <p><b>IL ONLINE ELECTRONIC PUBLISHING</b></p> <ul style="list-style-type: none"> <li>• The advertisements and the content are displayed through the Italehti Online electronic publishing software.</li> </ul>
<b>OTHER INFORMATION SOURCES THAN THE PAPER VERSION</b>
<p><b>INFORMATION GENERATED BY ILTALEHTI ONLINE PRODUCTION</b></p> <ul style="list-style-type: none"> <li>• Interviews, games, chats etc. Such content is produced by journalists at Italehti Online.</li> </ul> <p><b>ONLINE NEWS</b></p> <ul style="list-style-type: none"> <li>• Information from different news agencies. This information can be news that comes in too late to be published in the paper version, e.g. hockey results from US. or when something important happens</li> </ul> <p><b>ADVERTISEMENT MANAGEMENT</b></p> <ul style="list-style-type: none"> <li>• Advertisements that come from advertisers are linked up to Italehti Online by the advertisement team consisting of two employees.</li> <li>• Advertising measurements</li> <li>• Demographic statistics such as sex, age and occupation.</li> <li>• Total number of hits on the advertisements and what type of readers classified by sex, age and occupation. Also number of readers per section and total number of readers.</li> </ul>

## ILTALEHTI

### GENERATION OF ILTALEHTI PAPER VERSION

- Published six days a week, not on Sundays.

## CUSTOMERS

### INFORMATION CONSUMPTION

- The Iltaalehti Online version is public to all subscribed readers with Internet access.

## STORAGE

### CUSTOMER FEEDBACK ARCHIVE

- The feedback from the readers is transferred via e-mail, which gives much faster feedback and journalistic response compared to traditional mail.
- The feedback can change the journalists' working method and content.

### ARCHIVE

- The Online edition is archived for the journalists only, readers cannot search for old articles.

### CONVERTED PAPER VERSION

- The paper version is stored as QuarkXPress documents, which are later used by the Iltaalehti Online production team.

## JOURNALISTIC GUIDELINES FOR ILTALEHTI ONLINE

"Journalism is an art, that is why it is hard to write a manual on how to pick out a good story"

- Keep the Online version simple
- The readers and the journalists are not Internet experts.
- Write simply and accurately, write for the "old lady in the cottage".
- Write about people with a human touch, "people are interested in people".
- When writing an article it is important to select an issue, find the core and present it.
- Common journalistic values have to be shared and clear because there is limited time to think beyond the daily production.
- Iltaalehti journalists try to know what the readers want through their professional experience and sensibility.

### First Iteration Loop

In the first iteration loop, which took one week, the development team presented results of the first analysis to each online service's reference group, which consisted of their key people. The development team included several professions, e.g. journalists, computer scientists, engineers and web designers from both online services. This first presentation to the reference groups also gave the chance to verify data. The characteristics, market drivers and added-value activities were discussed. The analysis had shown that traditionally each media product had had its own organization, where the product was developed and produced in a linear sequence. The cost to start and run new media ventures had become substantial with the traditional working methods and organization. Nevertheless, real time conditions require staff with multiple-skills and flexible working methods. Concerning the journalistic content, the balance between speed and quality was a delicate task for the journalists, since the high volume of journalistic content had to be quality assured before being selected and published on the web site. This was often assured by using reliable sources

based on facts, which prevented journalists from making errors. At Iltalehti Online the sections for sport, entertainment, people and common news are popular. People are interested in people. In this type of online service there should be a human point because emotion attracts. Online financial news, on the other hand, gives consumers the feeling that something is happening now. *"All information in newspapers is entertainment, real news is online"* as it was expressed by one interviewed news-desk editor. Online news is therefore important for the Kauppalehti image. The success formula in financial online news was identified as: search for facts, add a professional comment and do this faster than any competitor. The real competition was found to be in the newsroom, which had publishing deadlines running all the time.

It was concluded in the first iteration loop that the development team should try to create a combination of a news and entertainment online service. In our case it took four months of part time work before we had specified and launched the first Live Index version. The decision was made after we had discussed and combined benefits of different research alternatives for each online service. At Iltalehti Online there was an interest in being able to simulate different new concepts because the present content and design concept had not changed much since it started in 1995. In order to simulate new online products on the World Wide Web, it was suggested that a web tool for prototyping be developed. Furthermore, the concept of micro-sites and daily-hotlines were found interesting to further develop. Micro-sites are planned stories or planned sections, which in themselves could generate ad hoc stories. In daily hotline services, readers can discuss and create stories about daily topics. At Kauppalehti Online there was an interest in creating more flexibility in the product. If flexibility increases, more tailor-made products could be produced. It was therefore interesting to create a product with a modular architecture that could combine different media content elements. However, the discussion concluded that the more flexibility a product has, the more it needs tools for quality assurance. Thus, flexibility can increase if there are tools to manage the information flow. For instance, the development team and reference group agreed that consumers of financial news prefer more information about the future. Information such as main events on the economic market the next coming year and future predictions about the economic market are highly valued. Consumers are willing to pay more if they get the information they are in need of.

### **Second Iteration Loop**

In the second iteration loop, which took about four days, the development team and reference group concluded that the first version of Live Index should be divided into two online services. The combination of news and entertainment in one online service was thought to be too confusing to the consumer. Therefore, the second version was an entertainment online service while the third version was a news online service. Each new version was documented. Though the

second version had several possibilities, it was not further elaborated. Instead, the online news service concept was explored. During a couple of days the themes and design structure were chosen and released in the third Live Index version. The development team and the reference group had found the following advantages with the Live Index concept: 1) it was a live web cast presented through one interface; 2) it was run by a web-dj, who could create a personal interaction with the consumers; 3) Live Index would function as a test bench to try different journalistic and technical ideas; 4) Micro-sites were created by structuring information into categories and themes; 5) Past, present and future news were presented, which gave the consumer the feeling that something was constantly happening. The development team and the reference group had also found the following difficulties with the Live Index concept: 1) it still remained unclear how the published information was going to be technically classified and stored, since there was no multi-media database available; 2) due to the fact that it was a live web cast, it was unclear how one would retrieve information; 3) there were no automatic digital forms and templates to structure incoming feedback from the consumers.

### **Third Iteration Loop**

The purpose of the third iteration loop, which took three days, was to set the design of the fourth version and make the practical preparations for the evaluation. The reference group and the development team discussed several alternatives how to present the fourth Live Index version. The alternatives were either to make a mock-up or run a functioning online service for one to three days. It was also discussed whether the test period should be targeted towards a limited test group or published in public. In order to keep the project manageable and evolving, it was finally decided that the fourth version was going to be produced and launched in-house and evaluated for three days. Apart from the development team and its reference group, two internal evaluation groups were established. The development team wanted to address, for the evaluation, people of different ages, professions, online experience, geographical location and company affiliation. Live Index was announced to all Alma Media employees with Internet access. Three different questionnaires were made with specific questions regarding the features and design of the Live Index. Each questionnaire was as specific as possible in order to speed up the evaluation process. All questionnaires were published online. Using a questionnaire online was practical since the data could be processed fast. The questionnaire was used as a tool to sense and interpret the consumers' preferences. The goal was to ask key questions that could be answered briefly and accurately. This would facilitate quick modifications of the online service. The development team and the selected test group were also addressed with questions concerning the concept of Live Index and if it had changed, influenced or challenged the present working methods for journalists and product development projects.

### **Fourth Iteration Loop**

When the fourth version of Live Index was launched internally at Alma Media Corporation it was run by different web-djs for three days with current news and themes. The evaluation of the questionnaire took half a day. The three features most valued by the test groups were (1) the front page idea, having all information displayed on one page, (2) displaying past/present and future news, and (3) showing video news. Live Index was considered to be a news portal that consisted of many sources and was constantly updated, though sometimes with too long down-load time due to high data exchange in e.g. the video news. This could be improved by supplying the consumers with a Live Index plug-in kit. However, the test groups did not feel that they were diverted to other sites. The theme idea was appreciated but its focus and presentation form was perceived more confusing than clear to the test groups. The development team and the reference group therefore discussed how a focus on one theme at a time would work and how to make a theme more complex. They also discussed how it should be structured and how long a theme should be published on the site. It was important to provide the consumer with an approach to each theme. A map to facilitate navigation in the theme was suggested to help the consumer. The evaluation showed that the test groups enjoyed the web-dj concept but not in its present form, though it was challenging to have a web-dj personality with an intellectual and provoking character who could interact with the consumers. However, the development team and reference group came to the conclusion that the web-dj concept was not optimal for a news site. Instead, it would work better in a forum for discussion and opinion gathering. It was more interesting to concentrate efforts on streamlining the information feed and the news sites' structure. The test groups suggested keeping the site's "hawk eye" approach on other media channels but thought consumers of a news site would hardly be interested in participating in building the site. On the other hand, the test group supported the idea that consumers of an opinion/entertainment site would be more likely to be active. For instance, the test groups found the idea of letting the consumers order a story from a journalist interesting.

The development process of Live Index differed from other projects at Alma Media in the sense that it emanated from a journalistic idea rather from a market need. There was a combination of wild ideas and "let's-make-this-for-real spirit" as one person in the development team expressed it. The Live Index made it possible to test new journalistic ideas and it was a platform for trying out many ideas for the development team and for the media consumers. On the other hand, the evaluation showed that the development team thought the project goals were difficult to specify since they were constantly changing. Despite changing specifications, it was important for those involved that the product idea was clear when it was time to launch it. The constant update of Live Index was challenging for those involved. The web-djs thought it inspired new ideas for future www-content and content for www "mobile channels".



Live Index gave Alma Media journalists a chance of getting a concise look at the current news stories, and provided easier access to other Alma Media web sites. The development team was asked if a checklist or development model could help to push ideas forward faster and in a more structured way. The evaluation showed that the team was positive to having a development model because in a running project everyone involved could then be aware of what is currently in process.

### **Fifth Iteration Loop**

A fifth version of Live Index was not launched on the market since it was decided to postpone the public release. However, the idea was, in the case of a later market release, to create a questionnaire with ten key questions, which could be evaluated and implemented within a couple of hours. But the development team also discussed how a fifth version of Live Index could change taking into consideration the experience and new ideas from the previous evaluation. This discussion resulted in dividing Live Index into a pure news site and an opinion arena in order to further improve focus and functionality. The development group decided to go ahead and develop the news site. For each site they specified which features and characteristics were considered significant.

LIVE INDEX - A NEWS SITE	AN OPINION ARENA
<ul style="list-style-type: none"> <li>• Well structured site</li> <li>• Real time news</li> <li>• No need for a web-dj personality in the news site</li> <li>• Use text as much as possible</li> <li>• Image and audio when necessary – as little as possible</li> <li>• Display time and source of incoming news</li> <li>• The site should be as economical as possible concerning down-load time</li> <li>• Present linked stories</li> <li>• Present past/present/future news</li> <li>• Searchable news site</li> <li>• Display radio and TV news in text format</li> <li>• Show more background information about Live Index</li> <li>• Create a News Engine. News arrives and becomes classified according to time, source, keyword and comment. The news is then automatically placed on the web site.</li> </ul>	<ul style="list-style-type: none"> <li>• Run by a provoking, intellectual Web-dj personality</li> <li>• Consumer should be able to view the arena</li> <li>• Consumer should be able to hear the arena</li> <li>• Consumers should be able to contribute and interact</li> </ul> <p style="text-align: center;">THEMES</p> <ul style="list-style-type: none"> <li>• Same presentation structure as in Live Index</li> <li>• The theme should have a leading story</li> <li>• There should be some type of conclusions based on the stories</li> </ul>

Table 1. Shows the specifications of the fifth version of Live Index and a new site for discussion and opinion gathering. The selection was based on the evaluation of the fourth version of Live Index and a discussion within the development team.

### Discussion

“What is new about new media comes from the particular ways in which they refashion older media and the ways in which older media refashion themselves to answer to the challenge of new media”[Bolter and Grusin, 1999]. Multiple media channels and new technology have intensified the competition between media companies. In a competitive online business it is crucial for media companies to stay alert and continuously supply their consumers with a variety of products. The goal is to minimize the product’s time to market. Therefore, product development under such market conditions is time-critical. According to Saari, the survival of media companies depends on the quality of the relationships with their present (and new) consumers and the ability to produce content that ‘resonates’ with their consumers. This means building up confidence in their services and an ability to continue operating at the interface of a certain consumer and his/her world [Saari, 1998].

### **Purpose**

In order to generate new online services fast, a development process with multiple iteration loops was explored. In a changing environment one single development model cannot be strictly followed. Instead the best model needs to be temporarily selected and used in the current situation. Live Index was developed in order to elaborate on different working methods. Live Index emanated from a journalistic idea and was based on identified successful key characteristics and drivers from our analysis of Iltalehti Online and Kauppalehti Online. Previous research on newspaper development projects had indicated that highly specified product concepts were suitable for minimizing the time to market, but limited on the other hand the project group's level of creativity [Rosenqvist, 1999]. Live Index was developed with an organizational bottom-up approach. In a time-dependent process we found this powerful since the product and the project became immediately tangible. This was achieved by systematically analyzing backwards from the product level which components, software tools, knowledge, people and resources were required for Live Index.

### **Documentation process**

Versioning and evaluation of Live Index on the web was inexpensive and fast. Continuous documentation throughout the development process was done for several reasons. First, it clarified and structured the outcome of the iteration loops. Second, it facilitated for all people involved to stay updated if they were not present in the discussions. Third, it made it possible to return to and reuse previously neglected versions. We learned that, in rapidly changing environments, multiple choices are important. An idea can have the right concept but miss the right timing or the right technology. Such things can change fast in this type of environment. An old concept can then suddenly be of interest, which was an argument for us to develop several Live Index versions in parallel during the iteration loops.

### **Evaluation process**

The evaluation process was an in-house operation. A sequence of test questions throughout the development phase facilitates keeping the design constraints open as long as possible. Too fast and too definite a change of the first version would have limited the use of new input in evolving versions. According to our evaluation, a specific test group was more efficient than a large anonymous test group for receiving consumers' feedback. The reply rate in test group three was less than one percent compared to a nearly 100 percent reply rate in the other test groups. Efficient evaluation questions were difficult to write. Each new questionnaire should become more accurate and clean-cut so that the development group could from the evaluation know exactly what should be changed. The final modifications after market launch could then be adjusted within a few hours.

### **Development process**

Fast and multiple iteration loops are consequential to the success of the development process. In a fast changing environment people need clearly to know their responsibility and have fast access to support in order to keep up the development pace. By applying a process development model everybody would have a clear picture of what the project is trying to accomplish. A benchmark tool could also be useful to compare different projects within or outside the company. It is important that each team member is interested in the product development of the specific product and contributes ideas. Temporary working groups create ways of sharing knowledge. The blend of different sex, nationalities, skills, background and experience are important factors when creating innovative and dynamic development groups. These groups can be independent of either organizational or geographical borders. According to Sawyer, social processes such as the level of informal co-ordination and communication can account for 25 percent of the variations in software product quality [Sawyer, 1998]. The development team behind Live Index consisted of seven persons representing different nationalities, brands, skills and background. The evaluation showed that the team appreciated this mix and it was considered to have had a positive effect to the level of creativity and problem solving. On the other hand, this implied that the group did not operate from the same location and did not have the chance to discuss on a daily basis. However, a shared mind set helped the participants to be synchronized despite few meetings. Thus, tedious meetings could be replaced by regular, brief and concise summaries.

Using several iteration loops indicated in our case constantly changing specifications. This forced the development team to synchronize its efforts, evaluate and discuss a lot in order to maintain the development pace. However, there should be a built in tolerance towards people coming and leaving the development process especially if it involves many participants and is time intensive. In our case several production concepts were considered in parallel during the iteration loops. This project taught us not to set design constraints too strictly in the beginning. On the other hand, it was necessary to select one line of development. This does not exclude the possibility to return to previous product concepts. An important lesson in web production was the value of just starting development because one learns along the development process. However, a development model gives structure to the working process. The model shows that the frequent iteration loops were processed faster towards the end of the development time, which indicates among other things that the development team became more synchronized in its operations. One can also see how the online service becomes more simplified along the development process. If specifications change, it does not necessarily imply that the project has lost focus. This is important to know since one can feel somewhat disoriented when specifications change and the development time is running out.

The key issues in web product development based on this study can be summarized as follows:

- Experimentation and parallel versioning is useful to do since an idea can have the right concept but miss the right timing or the right technology. A minimum of development constraints should be set in the start of a product development process in order to keep it open for new input.
- Using evolutionary prototyping made it possible to fast reach results and also have input on the evolving product from the reference groups.
- An organizational bottom-up development approach was powerful since the product and project became immediately tangible.
- Brainstorm sessions was an efficient alternative in the iteration loops to generate, test and evaluate ideas and concepts.
- It was better to start development than first execute a detailed plan for the development project because team members learned along the development process.
- Temporary working groups create ways of sharing knowledge. It is therefore important to build a team consisting of multiple skills in order to be able to cover many aspects of the product.

Using the web as a test bench to try out new ideas challenges traditional media development projects and traditional working methods. For example, journalists may need to write their stories in such a way that they can be reused and published in multiple media channels. The World Wide Web provides a platform for developing and testing new media combinations in both a fast tempo and at a competitive cost.

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