

Designing New Environments, Devices, and Interfaces that Promote Propensity to Consume

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OVERVIEW: By observing the consumption behavior of consumers we can infer consistent values and tendencies, and the acquisition of this information is extremely important for offering products and information services. Examining these trends more closely, it is apparent that consumption rarely occurs in isolation but is generally linked to a particular location, an event, or certain specific information in what we call a consumption chain. Considerable attention has recently been focused on efforts to analyze consumption chains, figure out consumer behavior, and apply the findings to retail and service industry solutions. We have conducted surveys and other studies to explore three aspects of consumption chains — (1) designing spaces where information can be more easily accessed, (2) the concept of digital information devices that are fun to use, and (3) user interfaces that are easier to use — then applied the findings to create information environments that trigger agreeable consumption chains and encourage consumers in the enjoyable buying of the goods and services that they like.

INTRODUCTION

CONSUMPTION is an important means of self expression. For example, the consumption behavior of people in such non essential areas as where they eat out, what they do in their spare time, and how they

pursue personal hobbies and interests very much depends on their values, and are key factors in defining one's lifestyle. Investigating these things and illuminating the consumption patterns of consumers is critically important for conceiving attractive

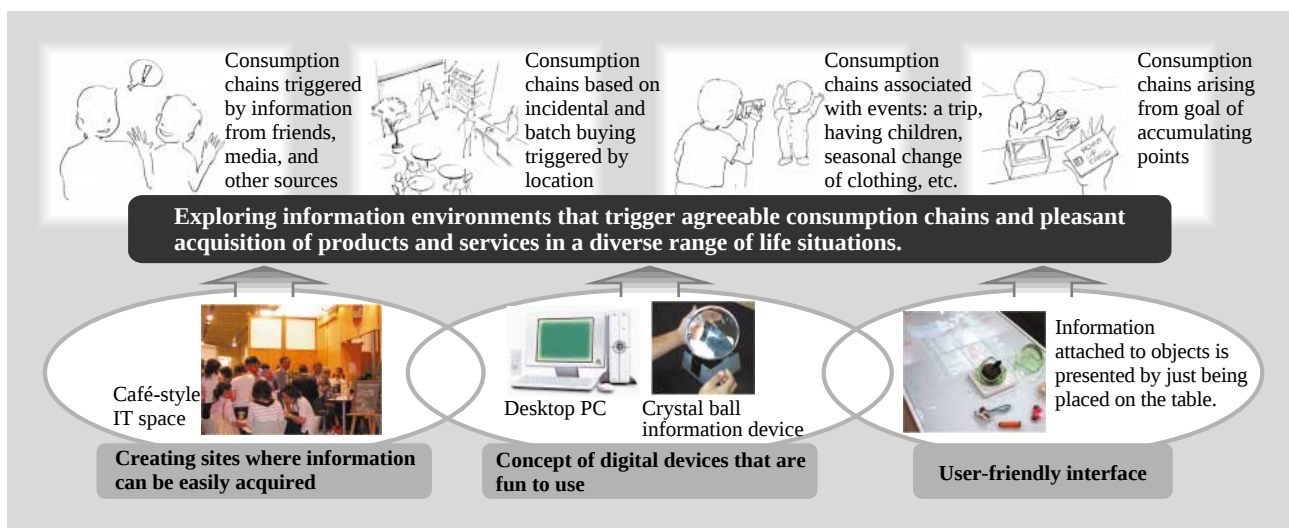


Fig. 1—Consumption Chain Examples and Information Environments and Ways of Providing Information that Trigger Consumption Chains.

To meet the needs of its customers, Hitachi goes beyond the mere provisioning of products and services. Hitachi researchers are exploring how certain locations and events trigger consumption chains, and are seeking to discover how information spaces, digital equipment, and user interfaces might best be designed to stimulate and promote the propensity of people to consume.

information solutions targeting the needs of individuals in the ubiquitous information society. At the same time, this information is also extremely useful in providing solutions to retailers and service providers who would escape fierce price competition by adding value and who want to understand the true needs of consumers.

This paper provides an overview of some of our recent work on new digital information device concepts and information environments that trigger consumption chains and could benefit users, information providers, and retailers alike, as well as research on user interfaces to achieve these ends.

CONCEPT OF CONSUMPTION CHAINS AND INITIATIVES OVERVIEW

To discover consistent values and tendencies observed in consumption behavior from people's purchasing history, we identified classes of consumers whose values were reflected in their purchases and conducted a survey by recording the 5Ws and 1H (what, when, where, who, why, and how) associated with their consumption behavior. Through this survey we were able to abstract the typical consumption chains shown in Table 1. Fig. 2 shows one example: the consumption behavior of a female monitor in her 30s.

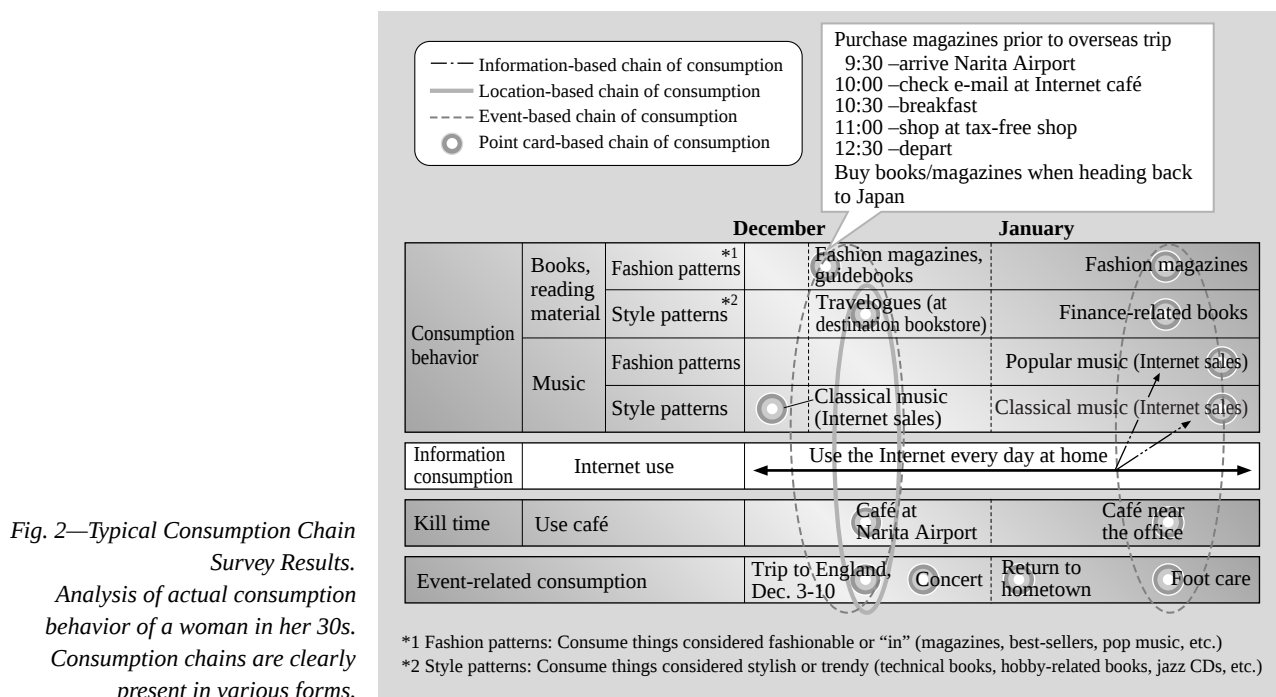
It is apparent that several consumption chains are involved in this case: clearly there is an event chain relating to the event of an overseas trip in December, a location chain triggered by the place she visited, and

an information chain triggered by information obtained by the woman. We also know that a point card is often involved in many consumption opportunities. It is clear from examining consumption patterns that they are accompanied by a certain amount of so-called "incidental buying." Consumption chains thus provide a powerful clue in understanding counter-deflationary consumption behavior in non-essential areas.

The importance of this kind of retail and store management that focuses on chains of consumption has been growing in recent years. This is exemplified by the cafés and coffee shops combined with other kinds of stores that have been springing up in recent

TABLE 1. Classification of Consumption Chain Patterns
Results of the survey indicated that consumption chains can be classified into four types.

(1) Information chains	Consumption chains triggered by availability of other products at the same place: incidental buying, batch buying, etc.
(2) Location chains	Consumption chains triggered by events: trips, marriages, births, seasonal change of wardrobe, etc.
(3) Event chains	Consumption chains triggered by information from friends, the media, mass communications, the Internet, etc.
(4) Point card chains	Consumption chains triggered by the goal of accumulating points



years. The combination of Barnes and Noble bookstores with Starbucks coffee shops might be the best known example in the U.S., but in Japan too one can observe cafés built as an integral part of bookstores, gas stations, home centers, interior design firms, travel agencies, banks, brokerage firms, and more. The whole point of these in-store cafés is that customers became habituated to coming to your store more often and staying longer, and this can lead to other purchases and trigger a new consumption chain. We believe that the combination of information delivered over the Internet plus Internet browsing as a pastime holds enormous potential as an effective combination for triggering consumption chains.

Based on the above survey and inspired by real-world examples, we investigated how consumption chains might be triggered by information services provided by digital equipment in a wireless LAN environment in a manner similar to the way services are provided by cafés and other stores. For such LAN-based environments to be effective in triggering consumption chains we assume that

- (1) the digital equipment should be as uncomplicated and intuitive as possible to support thought chains geared to a large base of users, and
- (2) a good deal to thought and attention should go into the design of the information space to project the same kind of refined yet relaxed atmosphere of an up-scale coffee shop or café.

TRIGGERING CONSUMPTION CHAINS BY PASSIVE INFORMATION BROWSING

Generally when browsing information on a PC or some other conventional type of equipment, the user assumes an active role in controlling the equipment. However, the triggering of consumption chains demands a more passive approach in which information of interest is presented in a timely fashion even though the user does not have a clear-cut objective and is not looking for any specific information. And considering the point made earlier that chains of consumption are unlikely to smoothly emerge if the system is overly complicated to operate, we came up with the concept of “passive information browsing” that naturally arouses new interests without any sense of operational complexity, and developed several prototype devices to assess this concept.

Button-less Mobile Device

We first attempted to implement the concept of “passive information browsing” with the development



Fig. 3—Button-less Mobile Device.

The mobile devices will be implemented in a variety of different colors that encourage people to pick up the device and play with it.

of a novel mobile prototype device that was first unveiled in 2001. Guided by the key concepts of “passive browsing” and “intuitive operation,” we built the device as a pleasant diversion to entertain during spare moments such as when waiting for a train or bus.

Fig. 3 shows photographs of the button-less mobile device. It lacks any buttons for turning the device on or off or operating the device. Rather, the display shows bubbles that float up from the bottom to the top of the display, and each bubble contains an icon indicating a mail or image file. By tilting and jiggling the device, a particular bubble can be maneuvered to the center of the display, and its contents viewed by holding the device level. The bubbles seem to obey the laws of gravity, and this makes the device intuitive and fun to play with and operate. It was first introduced to the public in 2002 at CEATEC Japan 2002 and other venues, and now over 2,000 visitors have had actual hands-on experience with the device. The concept of passive browsing and the entertaining interface met with widespread interest and approval by most of the people who tried it.

Crystal Ball Information Device

The availability of free time is often associated with a particular place such as when waiting for someone at a coffee shop or waiting one’s turn at a hair salon, so we developed a desktop version of the button-less mobile device that could be located in such places.

As shown in Fig. 4, it essentially looks like a crystal ball. Like the mobile device mentioned above, it lacks any buttons for operating or turning the device on or off, and provides entertainment by gazing at images that are displayed inside the ball. The globe is operated simply by moving one’s hands while holding the device. Icons containing contents can be manipulated

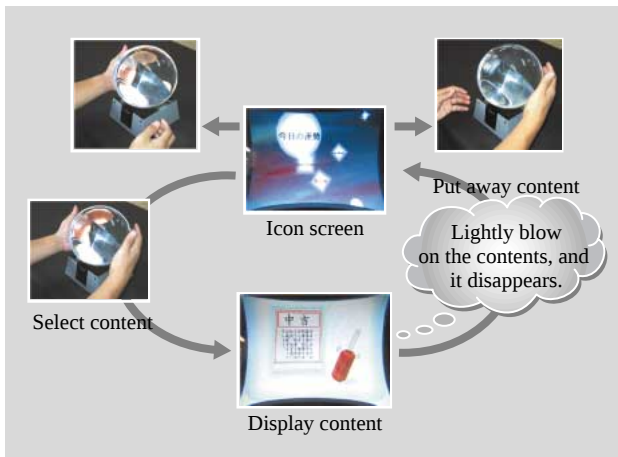


Fig. 4—Crystal Ball Information Device in Action.
The example of content shows a fortune teller. Icons slowly float up from the bottom on the icon screen.



Fig. 5—Desktop PC View Screen.
Thumbnails slowly drift past to the left.

and moved by bringing your hands together, and contents are displayed by maneuvering an icon to the center and encircling it with both hands. Contents can be put away in an equally intuitive and user-friendly way by lightly blowing on the sphere. At first glance the crystal ball information device just looks like a transparent sphere, but then you begin to notice icons and images floating around inside the sphere, and you cannot help but gaze intently into the ball. We are now considering what sort of contents might be best in applying the passive browsing concept used by the information device.

New Model Personal Computer

The PC is a new model that was just added to Hitachi's lineup in January 2003. The notion of intuitive browsing was incorporated into the development of the PC from the very start, and the computer comes with special software supporting a new visual perspective.

Fig. 5 shows a typical setup of the default screen. It consists of several rows of thumbnail images with the latest video clips captured from various TV channels at the top, news sites that are frequently accessed and an Internet site providing directions (where to change trains, etc.) at the bottom, and image and music files saved in a folder of the user's choosing in the middle. The entire screen full of images slowly scrolls to the left so the user can see from the thumbnails what information is available, and can easily zero in and access information with a single click.

As the screen full of thumbnails slowly drifts past,

users can focus on items of special interest in a manner similar to the “cocktail effect” (the tendency to focus in on what is important in an environment while filtering out what is not important) and can click on that item and perhaps trigger a consumption train leading to a series of purchases.

CAFÉ-STYLE IT SPACE CONCEPT AND BUSINESS EXPANSION

Café-style IT space is a new style of conceptual space for exchanging information that is geared toward the ubiquitous information society now emerging. Hitachi demonstrated the concept for a limited period at the Hitachi-IT Convention 2002 and at CEATEC Japan 2002 exhibition sites. The purpose of the demonstration was to create an environment in which visitors could connect to the Internet over a wireless LAN while at the same time experiencing the taste and flavor of real coffee. This was also an experiment to see if we could trigger a consumption chain by providing information similar to the way consumption chains are triggered by in-store cafés that we described earlier. In coordinating the overall space, we were mainly concerned with the following three points:

(1) Create an environment that is clearly distinguished from ordinary wireless LAN environments

With the goal of creating a space that might trigger a consumption chain, we wanted to endow the space with a certain level of refinement and quality. Partnering with a high-quality specialty coffee franchise, we sought to create a relaxed and comfortable atmosphere that make younger-to-middle-aged sophisticates wish to stay longer.



Fig. 6—Café-style IT Space Scene.
Café-style IT space set up at exhibition sites.

(2) Satisfy all five senses of visitors

The visual and auditory information provided by IT equipment are complemented by other senses—the taste and aroma and warmth of real coffee. Our spokespeople at the booths also made a special effort to connect and communicate with visitors to the exhibits.

(3) Present a total solution making full use of all resources

In addition to the mobile devices for passive browsing, we also presented information using active browsing devices such as PCs, PDAs (personal digital assistants), and tablet PCs, and large-screen PDPs (plasma display panels). Besides material gathered from the Internet, we also made good use of a variety of original content including games (in cooperation with DIGITAL HOLLYWOOD Corporation), jazz compositions (thanks to J-Net Communication), and photographs taken by a number of young photographers.

Fig. 6 shows an overview of the café-style IT space demonstrations. This combination of café plus IT products was well received as a consumption chain site. In the many types of locations throughout society where people have time to kill and would be receptive to diversions, there are rich opportunities to provide all kinds of imaginative terminal equipment including the passive browsing terminals described earlier.

Based on these experiences, we are now proposing a solution modeled after café-style IT space. For example, one objective is to trigger a consumption chain by computerizing the final point of contact with customers: the customer window or service counter. We are also promoting premarketing activities targeting financial services, hotels, beverages, and package media sales (books, game software, CDs, DVDs, etc.), and other products and services.



Fig. 7—Tabletop Display with Object (left) and Screenshot (right).

An object is placed on the table, and information linked to the object in advance is displayed. This example of content shows a message from an apple farm.

USER INTERFACE INITIATIVES

We have emphasized that the methods for delivering information to the places where people actually spend time and getting feedback from users (based on their operation of IT devices, for example) are critically important for triggering chains of consumption. Indeed, research into these kinds of human interactions are so important that researchers, designers, and marketing people were brought together to establish the Hitachi Human Interaction Laboratory (HHIL) in November 2002.

In addition to building prototypes of devices that are fun to operate such as described earlier, the HHIL is also working on interfaces that are so user-friendly that users are not even aware that they are operating a device, and other human interaction-related issues from a very broad perspective. Illustrating this latter line of research is a recently developed prototype system. The basic concept is that an object is associated with information relating to that object, then all sorts of information can be presented relating to that object. A prototype version terminal was implemented as a tabletop that can be used to continuously display images and other information relating to a given object.

Fig. 7 shows an installation of the prototype system tabletop display and a screenshot showing what the device displays. Hitachi's microscopic RFID (radio-frequency identification) tag "μ-chip (mu-chip)" is used to establish the association between object and information, then data corresponding to the ID number is accessed in a database and displayed. The data could

be practical information such as where the object was produced or its distribution route, or it could provide tourist information or scenic images associated with a souvenir. Dissemination of the μ -chip was originally conceived as a way to make distribution channels more efficient, but the μ -chip also can be used as an efficient tool for triggering chains of consumption. For example, the chips might be used to provide information about when and where a product was obtained after it was purchased or to create interest in visiting a particular store.

CONCLUSIONS

Consumption rarely occurs in isolation, but rather one purchase often leads to other purchases forming a consumption chain. This paper highlighted some of Hitachi's recent initiatives in understanding and developing information environments that could trigger consumption chains.

The challenge is to gain a multifaceted understanding of information environments then furnish solutions that are attractive and tailored to the needs of consumers based on that understanding. Our efforts will continue to focus on enhancing the robustness and speed of the product development cycle (user survey $\rightarrow$ hypothesis $\rightarrow$ prototype $\rightarrow$ verification), and developing and deploying solutions from the users' perspective.

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