New Bricks and Mortar Marketing Technique Based on Human Behavior Measurement

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OVERVIEW: In recent years, internet companies have used big data on people's behavior on the web to conduct behavioral marketing in which they rapidly work through the PDCA cycle. Accompanying this, there have also been moves to apply these same marketing techniques in the physical "bricks and mortar" world. Techniques and know-how on the measurement of human behavior and its quantitative representation developed over time by Hitachi are suitable for deployment in new marketing techniques like these that are applicable to bricks and mortar environments, and Hitachi is currently working on developing them into solutions.

INTRODUCTION

MEASURES aimed at taking advantage of advances in information technology to utilize big data and apply it to the sources of companies' competitive strengths are becoming increasingly common. Internet companies like Amazon[*1] and Rakuten[*2], for example, are making considerable use of these techniques and have successfully applied them to boost competitiveness, particularly in marketing.

Underpinning the successes of these companies are advances in big data technologies that support the collection and analysis of records of purchasing behavior by ordinary consumers. These technologies allow internet companies to apply the plan, do, check, and act (PDCA) cycle of progress by trial and error to a variety of marketing activities, and to work through the cycle rapidly. One possible example would be to experiment with two different forms of web advertising and then to analyze the access logs for customers who view these ads. This can provide feedback to new marketing activities. For example, the company could assess the actions of customers before and after viewing the ads to determine which of the two forms is more effective, and then proceed with a full-scale campaign using the more effective option, all within the same day.

Coupled with this ability to work through the PDCA cycle more quickly, these advances in marketing techniques based around the internet provide internet companies with significant competitive advantages. For the bricks and mortar retailers who operate the physical stores that accounted for the bulk of purchasing activity in the past, this entry of new players has brought intense competition. An example of this new purchasing behavior is the customers who use a bricks and mortar store to try and choose what they want to buy, and then make their purchase online after shopping around internet retailers to find the lowest price. As a result, bricks and mortar retailers are looking for new approaches to marketing that can counter their internet competitors.

This article describes behavioral marketing techniques that utilize a variety of technologies to assess customers' state of mind in physical settings, something that was not amenable to machine measurement in the past.

*1 Amazon is a trademark of Amazon.com, Inc. or its affiliates.
*2 Rakuten is a trademark or registered trademark of Rakuten, Inc.

POTENTIAL OF BEHAVIORAL MARKETING

This section describes the potential for using behavioral marketing to make quantitative assessments of human behavior in physical settings and to determine the customer's state of mind, the critical factor from a marketing perspective.

Understanding Customers in Bricks and Mortar Stores

While the term "marketing" covers a variety of different factors, the key focus in the current context is on understanding customers.

The following describes techniques currently used to understand customers in bricks and mortar stores.

Traditionally, these have fallen into three main categories.

(1) Analysis of sales information collected at the point of sale (POS)

(2) Use of points-based and other loyalty cards to analyze the purchasing history of individual customers

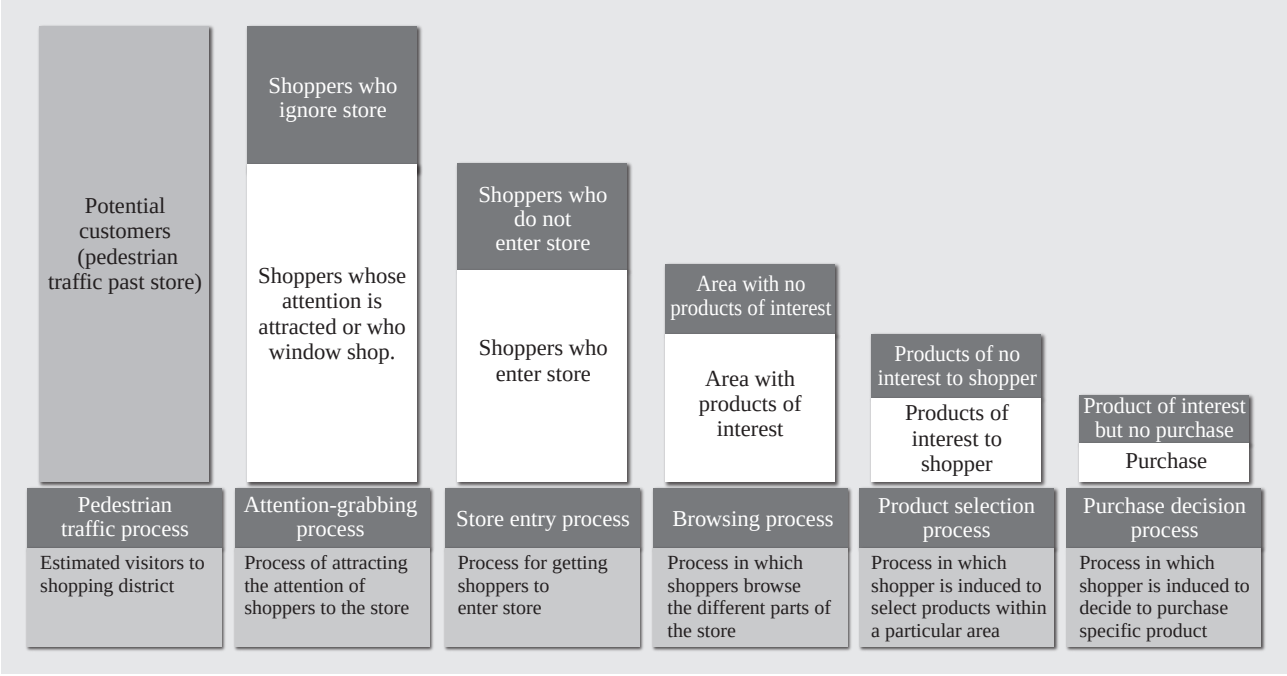

Fig. 1—In-store Purchasing Behavior Model.
Appropriate measures can be adopted for each process leading up to a sale by quantitatively assessing the processes to understand the factors involved.

(3) In-store questionnaires and other studies of customer behavior

These methods were first introduced decades ago, and have remained in use ever since because they provide effective ways for learning about customer purchasing behavior. Sales information collected at the point of sale, for example, can be used to determine what sorts of products customers are buying and when. Similarly points-based and other loyalty cards can be used to obtain time-series purchase history data for individual customers. The most effective means of all for learning about customer behavior has been in-store questionnaires.

However, while POS or loyalty card data can be used to determine what products customers have purchased, they provide no insights into what these customers were thinking or feeling when they were in the store. In-store questionnaires, meanwhile, are time-consuming, and because samples sizes are limited, they do not necessarily capture the full diversity of customer thinking.

Determining Customer State of Mind

This section looks at what is needed for bricks and mortar stores to implement marketing practices that can rival those of their internet competitors.

The first requirement is to find better ways of determining not only customer purchasing behavior, but also their reasons for not making a purchase. In other words, their state of mind. For example, customers peruse a variety of products in the store and only make a purchase if they find what they want. That is, customers' actions and states of mind are influenced by a variety of processes on the way to making a purchasing decision (see Fig. 1). Therefore, it should be possible to boost total sales by understanding the actions and state of mind of the customer in each process, and then using this as a basis for taking appropriate steps. In other words, instead of what customers purchase when they visit the store, what is important is to understand their state of mind (what they are thinking and feeling).

Next is the time taken to determine the state of mind of customers. The ability to work through the PDCA cycle rapidly is an important factor in the competitiveness of internet companies described above. Being able to revise the measures they use for marketing to customers within the same day is an example of this. Consider the case when point of purchase (POP) advertising is used. If it is possible to ascertain customer reactions on the same day as it is put up, then stores can use this information to experiment with better ways of presenting the advertising on the following day. By using these techniques to obtain prompt, quantitative feedback on customer reactions, bricks and mortar stores can

also achieve the rapid application of the PDCA cycle to their marketing practices. By dramatically speeding up the process of trial and error, this can result in even greater improvements to marketing practices in a bricks and mortar environment.

The aim of behavioral marketing is to use a variety of techniques to determine the physical-world behavior of customers up to the point of making a purchase in order to provide an insight into their actions and states of mind. This allows bricks and mortar store to work rapidly through the PDCA cycle for their marketing.

HITACHI'S TECHNOLOGIES AND ACTIVITIES

Behavioral marketing requires the use of a variety of techniques to determine the physical-world behavior of customers (see Fig. 2). Also required are ways of determining the state of mind of customers by analyzing changes in their in-store behavior and representing these quantitatively.

While there is no technological way of measuring customers' states of mind directly, they can be inferred by utilizing the know-how that Hitachi has built up in the quantitative representation of behavior. By calculating indicators representing such factors as the influence that POP advertising has on customers, the degree of interest that products invoke when inspected by customers, and indecision when looking at products, it is possible to evaluate these quantitatively.

Technologies for Capturing Customer State of Mind

Hitachi has been working on research and development of techniques for using behavioral indicators to infer the states of mind of customers since 2003. Over that time, they have accumulated know-how by analyzing one million days' worth of data on people's behavior (10 trillion data points). Hitachi has also spent many years on a variety of research and development involving human behavior measurement.

These techniques are categorized into "flows," "relationships," and "demographics," with different techniques being used depending on the application, sensor characteristics, or other circumstances to provide a fine-grained response to customer needs.

(1) Capturing "flows"

Laser sensing is a technique that can be used to determine the flow of people through a site. This involves using laser sensors to detect the location of people in an area and to record their movements as a trace. To date, Hitachi has built up know-how in how

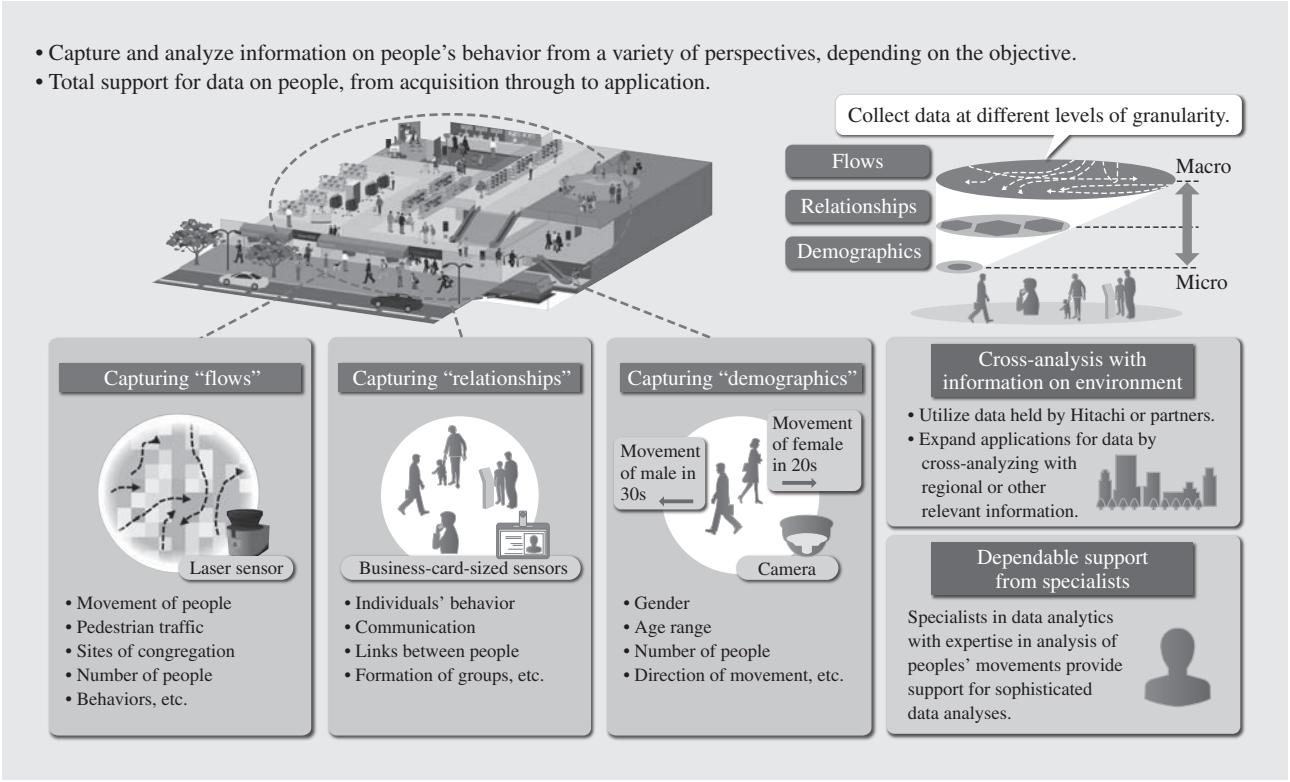

Fig. 2—Technologies Used in Behavioral Marketing.
Customers' states of mind can be inferred by utilizing and combining Hitachi's know-how in the quantitative representation of human behavior and techniques for capturing the "flows," "relationships," and "demographics" of people.

to detect intrusions, including by people attempting to enter an area by tailgating someone else.

This technology and accumulated know-how can be used to determine both the areas within a space where people congregate and the areas where nobody goes, for example. It can also be used to detect indecision when a person is simply wandering around a particular area.

(2) Capturing "relationships"

Communication measurement and analysis is a technique that can be used to identify relationships. It uses business-card-sized sensors and infra-red beacons to measure where people are and how they are communicating (face-to-face time, acceleration, etc.), and to calculate indicators such as their level of activity, constructiveness, and concentration time. Hitachi has built up know-how from its use in applications such as improving workplace productivity.

By applying this technology and know-how to estimating face-to-face times for people and objects, and their circumstances during these times, it is possible to provide insights into the relationships between people and between people and objects. It allows the use of indicators such as the amount of time staff spend face-to-face with customers and how constructively they are using this time, for example.

(3) Capturing "demographics"

Facial recognition is a technique that can be used to identify the demographics of people at a site. That is, it can be used to obtain head counts, ages, genders, and other information about the customers at the site.

Hitachi has built up know-how in the use of facial recognition in combination with digital signage to measure advertising effectiveness by detecting people in the vicinity of the signage.

This technology can be used to determine the demographics of the people at the site.

Application at Large Shopping Center

This section describes the use of behavioral analysis at a large shopping center.

The use of laser sensors to measure people's movements at a particular site found that there existed both places where the flow of people was congested and other places that remained largely empty with few people passing through. To make more effective use of space, stores have now been opened at the locations of these empty spaces (see Fig. 3).

Work is ongoing on measuring the value of different locations in this way so that action can be taken to increase this value.

Application at Large Retail Store

This section describes the use of behavioral analysis at a large retail store.

Measurements were made at a large retail store to identify what relationships were emerging, such as determining the attributes of customers being served and actions being performed on objects, and also to obtain information on shoppers' movements such as the proportion of people passing through each aisle. Correlations between sales and the placement of staff and products were found in the resulting data, and these were used as a basis for measures to increase sales, such as rearranging the staff and product layout.

This is an example of how even bricks and mortar stores can achieve a rapid PDCA cycle based on people's behavior.

BEHAVIORAL MARKETING SOLUTIONS

Hitachi makes possible a rapid PDCA cycle for marketing at bricks and mortar spaces by combining the technologies described above to infer the states of mind of customers at retail facilities and then to present this information in the form of numeric indicators.

Solution for Assessing Value of Different Spaces

This solution for assessing the value of different spaces is aimed at use in large retail facilities such as shopping malls. It can be used to ascertain the states of mind of shoppers (how they think and act) and to decide on how best to manage the overall site and implement measures for improving sales.

Examples include assessing the ability of specific locations at the site, such as stores or event spaces, to attract people, and determining the power of events to bring in customers by monitoring where in the

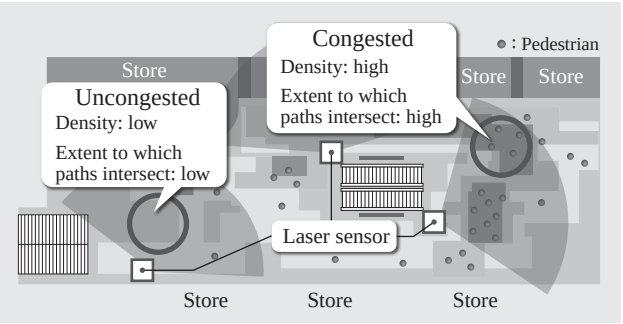

Fig. 3—Overview of "Flow" Measurement.
This involves measuring the "flow" of people and calculating parameters such as density or the extent to which paths intersect. The dark and light regions represent congested and uncongested areas respectively.

site people who have gathered for a particular event subsequently go. This can identify stores that, even if their own sales are not particularly high, have a positive effect on the overall site by attracting customers who subsequently visit other stores, something that was not possible using sales data alone (which was all that was available in the past). It can also be used to make quantitative assessments of the value of events. In other words, it facilitates a rapid PDCA cycle for improving subsequent measures at the site.

Purchasing Behavior Analysis Solution

This solution is intended for assessing the purchasing behavior of customers in apparel and other similar stores. It provides insights into aspects of the customers' states of mind, such as their purpose for visiting the store, whether they are uncertain about a purchase, and reasons for making a purchase. It can also make quantitative assessments of the effectiveness of the store's merchandising practices, such as the use of in-store advertising or the layout of products in the store. It raises sales by providing the means to experiment with better merchandising.

For example, it can be used to identify changes in customer behavior (state of mind) in response to factors such as how they are served by staff and the layout of products in the store. This can be used as a basis for initiatives such as creating a more inviting atmosphere for customers, placing products in ways that better catch the eye, and having staff serve customers in ways that encourage purchase decisions.

CONCLUSIONS

This article has described behavioral marketing techniques that utilize a variety of technologies to assess customers' states of mind in physical settings, something that was not amenable to machine measurement in the past.

Privacy concerns are an important consideration when implementing the marketing techniques described in this article. Hitachi is strengthening the privacy protections it has established in its big data utilization business to ensure that its customers and partners can utilize data without concern for privacy intrusions, and is incorporating these into its services and solutions. Hitachi is also working with partners from outside the group to offer products to customers that combine analysis with ways of making improvements in their bricks and mortar operations.

REFERENCE

(1) Doc Searls, "The Intention Economy: When Customers Take Charge," Harvard Business School Press (May 2012)

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