

Paper 349-2010

Smart and Synchronized: Analytic-Driven Web Personalization Using SAS® Customer Intelligence Solutions

Toshi Tsuboi, SAS Institute Inc., Cary, NC

Olaf Kratzsch, SAS Institute Inc., Cary, NC

ABSTRACT

For most businesses, the Web has become an important channel for managing relationships with customers since it has become the preferred, and in some cases, the sole method by which many customers interact with companies. As a result, delivering compelling communication and content during a Web session is critical in order to acquire and retain valuable customers and to develop additional sales opportunities. Companies such as Amazon.com and Netflix have achieved success by promoting products based on customer behavior. Other companies use the Web to deliver timely content based on significant changes in customers' lives and their relationships with the company. Regardless of the method, combining the rich data acquired during a customer's Web activity with powerful analytics is a key factor in improving the customer experience and generating additional sales opportunities. Two SAS Customer Intelligence solutions, SAS for Customer Experience Analytics and SAS Real-Time Decision Manager, provide companies with the means to capture data about the customer in real time and then use it to deliver personalized targeted content during the same Web session. This paper will provide details about the solutions, and how they can be used together to implement real-time personalized communications on Web sites.

INTRODUCTION

"I believe today's marketing model is broken. We're applying antiquated thinking and work systems to a new world of possibilities"

– Jim Stengel, CMO, Procter & Gamble

Marketing is going through a profound shift that is fundamentally changing how businesses interact with consumers. This shift is being driven by significant changes in consumer behavior in terms of how they consume entertainment and information, how they interact with businesses, and the process that they use to make purchase decisions.

As a result, while traditional forms of marketing such as direct mail and mass marketing are still powerful tools in reaching customers, they are becoming less effective. Marketers are reconsidering how they spend time and resources in reaching their customers. One channel that is receiving more interest by marketers is the Web. While many businesses have had a Web channel for a while, most have seen it as a low cost channel to provide product and service information. However, the importance of the channel has become more obvious in the last few years especially as the Web has become the preferred, and in some cases, the sole method that many customers use to interact with companies. In addition, the Web site has the capability to capture customers' interests, activity, and responses in real time, which is difficult or costly with other means. As a result, Web sites are now an important channel for managing their relationships with their customers, evolving from a simple, low-cost method of communication.

While many businesses have started to implement more sophisticated Web sites, most businesses have not implemented the capabilities to have a complete interaction with customers on the Web. This approach would involve both gaining a complete picture of the customer's behavior on the Web and then using the information to drive the real-time interaction. As a result, they are not able to use the full capability of the Web, especially given that channel's capability to deliver the highest response from customers.

This paper will discuss two SAS Customer Intelligence solutions, SAS for Customer Experience Analytics and SAS Real-time Decision Manager, and how they can be used to implement real-time personalized communications on Web sites so that companies have the means to implement a complete Web interaction with customers. One solution, SAS for Customer Experience Analytics provides the capability to capture session data about the customer in real time, and provide the capability to analyze the data for a better understanding of customer behaviors and preferences. Another solution, SAS Real-Time Decision Manager, provides the ability to use the insights developed from the analysis to drive real-time personalized content to customers. The two solutions can also provide the

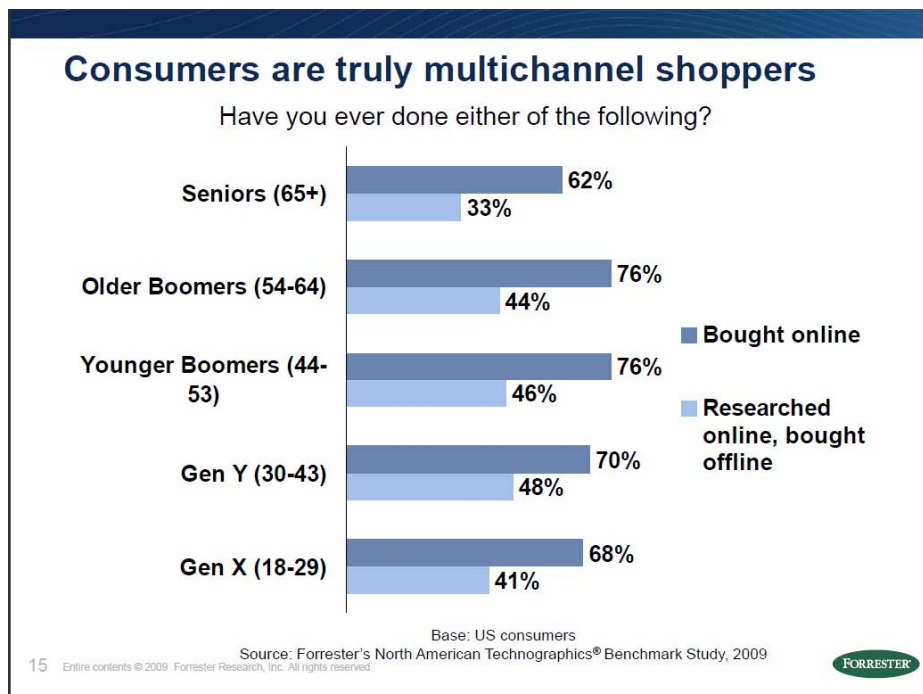
capability to use up-to-the-second customer session data as part of the real-time decisions that are used to determine the right targeted content.

WHY CONSUMERS ARE NOT PAYING ATTENTION

One of the most significant factors in the change in consumer behavior is the adoption of the Web in the last ten years. With the creation of new consumer Internet sites and services such as Facebook, Twitter, Flickr, and YouTube, the amount of time spent on the Web has increased dramatically. This trend is likely to continue with the prevalence and lower cost for using the Internet, especially with the development of netbooks and smart phones.

The wider and deeper adoption of the Internet by consumers has started to disrupt how they interact with businesses. Time spent on the Internet is taking away from time spent on traditional media, so it is becoming harder to reach them with marketing messages. In fact, the Web is becoming the preferred channel to get information and interact with business for many consumers. For example, according to the *Wall Street Journal* and Penn Schoen and Berland Associates, "a whopping 92% of respondents said they had more confidence in information they seek out online than anything coming from a sales clerk or other source" (Penn, 2009). As a result, more time and money needs to be spent on marketing on the Internet.

A similar disruption is also occurring in consumers' purchasing behaviors. In the past, purchasing behavior was linear in that a customer contacted a business when they were interested in making a purchase (for example, going to a store and getting a catalog) and asked for information about products, compared the products, and made the purchase, all from the same business. While some consumers might have comparison shopped, it was often with a relatively few businesses or products, given the difficulty of gathering information.



Now the Internet has significantly decreased the barrier for comparison shop. Comparison of prices across hundreds of Internet sites and physical stores are just a few key strokes away. In addition, various commercial and personal sites provide detailed information and reviews about many products that can assist consumers in making a purchase decision. The result is that what used to be a single linear process are now complex, involving interactions with multiple actors. Here are some examples (see Penn, 2009):

- 70% of Americans now say they consult product reviews or consumer ratings before they make their buying decisions.

- 68% say they spend at least 30 minutes online every week to help them decide what and whether to buy. Among Americans under 45, the number shoots up to 73%.

As a result, customers are now making purchases based on Web interactions that are difficult to track or influence. As a result, some businesses might never know that a customer is interested in one of their products until the customer is starting the final purchase process.

PERSONALIZATION

One marketing method that addresses changing customer preferences and the capability of the Web is personalization.

According to Wikipedia, "**Personalization** involves using technology to accommodate the differences between individuals. Once confined mainly to the Web, it is increasingly becoming a factor in education, healthcare (i.e. personalized medicine), and both "business to business" and "business to consumer" settings."

That means there are two parts to personalization that are often overlooked. Many personalization engines for the Web just work off the current behavior and recommend products based on your current behavior. They are missing the ability to identify individuals and to include the past behavior or available information about the individual that is present from other channels.

The individual in Web personalization is mostly reduced to a visit without taking previous behavior or offline behavior into account.

That also reduces the ability to fulfill the second part of personalization, which is understanding the individual's current needs and predicting the next best interaction or offer both for the customer and the business.

Visitors to your Web site would love to be treated as individual customers and not as part of a group of people (for example everyone coming from Google with a certain search term and getting the same recommendation).

There are generally three types of personalization:

Simple filtering

Content is displayed based on predefined groups of visitors. For example, if a site visitor comes from Google with the search term "credit card," show the latest credit card offer.

Simple filtering does not take into account any previous behavior or data from other channels.

Rules engines

Rules engines are a form of more advanced and combined filters. An example would be an offer for discounted event tickets to people visiting the events section but only for events that are in the area of the visitor's location.

Rules are more in line with the business objectives and allow marketers to adjust them in support of various campaigns.

Rules are still based on a group of people because maintaining rules for every individual would not be feasible.

Collaborative filtering

The first step is to create groups not based on fixed attributes but on similar behaviors. This requires the use of software algorithms. The individual's behavior will be compared to the group's behavior, and rules are set up to then drive the recommendations. An example would be a visitor purchasing tickets for a Bon Jovi concert. This puts the visitor in the group of "rock fans." Other members of this group also bought tickets for the Rolling Stones. Hence the visitor gets a recommendation for a Rolling Stones concert.

None of these three types really takes the individual and all available information into account. In an ideal world, you would like to offer a customer exactly what is relevant to him or her based on previous behaviors, current behaviors, and information available from other channels like credit risk scores, previous offline purchases, and so on.

The various combinations of behaviors for an individual are too many to be handled via rules or even collaborative filtering. Only predictive modeling allows you to find the right offer for each individual, taking all variables into account.

Rules engines could get close to it if they would allow defining rules automatically for individuals. Then you could pre-score the individuals and provide the next best offers for this individual. But pre-scoring only looks at the behaviors at the time of the scoring and does not take into account any activity that currently happens on the Web site. If someone just put a top-of-the-range TV and home theater system in a shopping basket, you probably don't want to offer that person the dishwasher even if that was highest ranked when you pre-scored the customer the previous night.

On Web sites, you can't always identify the individual, but you still want to be as personal as possible and increase your outcome.

The best approach to personalization is to combine all these techniques to get to a real next best interaction decision. And I am saying interaction as personalization should not be limited to the current Web site visit; the best response could be a delayed follow-up call instead of an online recommendation--especially if the online visit involves self-service or a claim or complaint. Or in a B2B environment, you would want to notify the sales representative that one of his or her customers did something very significant on the Web site that can't be put into context, given the available knowledge about that customer including the information not stored in any systems and decide on the next best interaction.

Fifty-eight percent of these marketers reported an incremental lift in conversions over the control by 5% or more as a result of using relevance tactics (Lovett, 2009).

- 79% increased average order value as a result of personalization
- 62% improved revenue per visit from personalization efforts (Aberdeen Group, 2007)

WHY PERSONALIZATION INITIATIVES CAN FAIL

Although personalization is a powerful marketing tool, businesses often fall far short in successfully implementing it on their Web site. The reason for failure often resides in three key issues:

- Businesses cannot gather and analyze the right type of data about a customer's activity on their Web page.
- Businesses cannot integrate the consumer data captured on the Web with the data captured from other channels such as direct mail, store, or the call center.
- Businesses do not deliver relevant content to the customer.

The first two issues results are a significant concern given how costly and difficult it can be to gather the data. With incomplete data, any analytical method that is used to investigate customer behavior can result at best in an incomplete understanding of the customer. At worst, it can result in a misunderstanding about the customer's preferences and behaviors. For example, if the data that you capture indicates that customers are most often viewing and purchasing your lowest cost product, you might assume that pricing is one of the most important factors in a purchasing decision. However, if the data about your customers' session is incomplete, you might miss that in fact customers are purchasing the product after reviewing positive reviews that were posted by other customers, indicating that quality is the important factor.

The third issue is just as important. A study has shown that a real-time interaction such as on a Web site has a high likelihood to achieving the goal with the customer, whether making a purchase or accepting an offer, especially compared to traditional outbound interactions such as direct mail. However, the key in achieving such a high response is relevancy; the high response rate is due both to the customer's being open to suggestions and communications (since they initiated the contact), and the suggestion and communication being delivered in the context of the interaction. When companies fail in personalization, they often just grab information about the customer, such as their name, address, or past purchases, and deliver it without any modification back to the customer. In these cases the communication might not only be out of context of the interaction, but also not relevant and causing the customer to ignore them.

USING SAS FOR WEB PERSONALIZATION

SAS has two Customer Intelligence solutions that can provide businesses with the capabilities to truly engage their customers on the Web. The first solution, SAS for Customer Experience Analytics provides the capability to capture session data about the customer in real time, and provide the capability to analyze the data for a better understanding of the customer's behaviors and preferences. Another solution, SAS Real-Time Decision Manager, provides the

ability to use the insights developed from the analysis to drive real-time personalized content to customers. Finally, SAS Real-Time Decision Manager can use the session data captured by SAS for Customer Experience Analytics as part of the real-time decisions that are used to determine the right targeted content.

CAPTURING SESSION DATA

SAS for Customer Experience Analytics provides an immediate and complete picture of your customers by capturing every Web site interaction, transforming those interactions into customer-centric knowledge, and integrating them with other channel views. This approach allows organizations to more effectively understand, model and, ultimately, market to these same customers. The four major benefits of SAS for Customer Experience Analytics are as follows:

DYNAMIC DATA COLLECTION.

Web data collection for SAS for Customer Experience Analytics is achieved through the use of a single line of HTML on each Web page. This simple approach to instrumenting a Web site means that from the moment the HTML is added and the collection server is configured, all required data is collected. Additionally, as the Web site changes, as long as the HTML remains in place on the page, data from the new or enhanced Web pages will automatically be picked up. And it takes into account all new Web technologies like Flash, AJAX, or embedded video players.

POST-COLLECTION CONTEXTUALIZATION

There is no need to maintain any custom variables in the Web pages. The post-collection contextualization process translates the technical click, type, and view data collected from the user's browser into business-relevant information, like product views, credit card applications, or newsletter registration. For example, with a single rule you can capture all product views on any page.

CUSTOMER CENTRIC OPEN DATA MODEL

The data is stored in an open data model and therefore accessible for any type of ad hoc query or analysis. But more important is the fact that it is stored in a customer-centric view with business-relevant activity assigned to the customer. So you can select all customers who viewed a certain product and exclude customers who loaded a certain URL.

And customer means really customer not just a visitor (cookie). SAS for Customer Experience Analytics can track customers via log-on, e-mail, or any other identifying information across multiple cookies. And it keeps a full history of all Web activity, even for unidentified customers because they might be identified in their next visit.

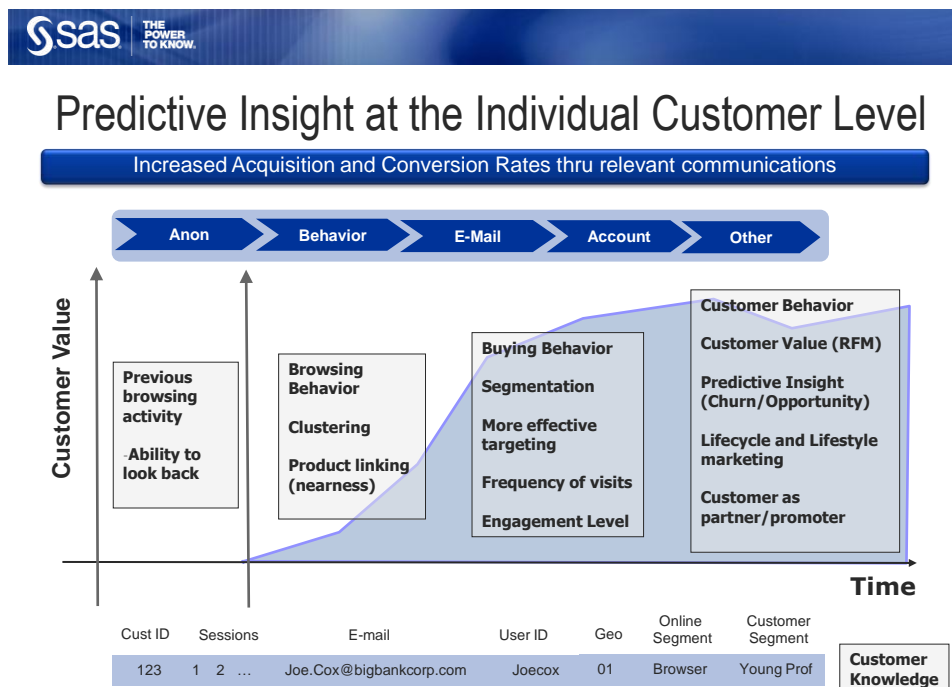


Figure 1: SAS for Customer Experience Analytics builds a full history of a customer

Every visitor to the Web site is treated as a customer in SAS for Customer Experience Analytics—whether they're identifiable or not. Most visitors can't be identified by a name, e-mail, or log-on in their first visit. SAS for Customer Experience Analytics places a permanent cookie so that the visitor can be tracked over time. The customer is still unidentified but already building up a behavior pattern (recency, frequency, and product interests) that can be used for personalization. As soon as the visitor identifies themselves by providing an e-mail or something similar, SAS for Customer Experience Analytics does not create a new customer but updates the history of the unidentified customer and adds name, phone number, address, and everything that can be gathered from any of the customer's visits to this single customer record. Web visitors tend to use more than one PC or delete their cookies. SAS for Customer Experience Analytics can combine the history of two or more cookies into a single customer when any identifier matches. This provides a real customer view not only a cookie view.

Analytical Models are crucial to determine the right content for Web personalization. To build accurate and reliable models, it is essential to have a complete view of the customer including the whole online and offline history. SAS for Customer Experience Analytics exactly provides this and the ability to combine it with offline data for much more accurate data.

REAL-TIME CUSTOMER STATE VECTOR

The real-time component of SAS for Customer Experience Analytics keeps an up-to-the-second state of the current session with all products viewed, goals achieved, and time spent on site and how far they progressed in any transaction. This session information is enriched by pre-fetching the customer history built up over time and thus having a most current customer state in memory including past and present behavior.

SAS Real-Time Decision Manager then takes all this information, fetching additional back-end data if required, to drive the most relevant next best interaction with the customer while taking current and historical behavior into account.

REAL-TIME DECISIONS

SAS Real-Time Decision Manager is the central decision engine within the SAS Customer Intelligence suite. It provides analytically-driven decisions that can be used in real time across multiple channels such as Web, mobile, and call center. The decisions can be made for each specific customer touch point to create a personalized

experience for each customer.

SAS Real-Time Decision Manager is designed to work with any Web site. Typically, scripts such as JavaScript are embedded in a Web page that makes a Web service call to SAS Real-Time Decision Manager. The solution then executes a decision campaign that can be designed for a wide range of tasks, such as determining the right image to display or the offer to present. It can access various types of data such as a customer's profile, past transactions, and events, whether they are provided by the databases or other systems. The decision is sent back to the Web site as a Web service response, which is used by the script to display the appropriate content to the customer.

Decisions are created by business users by creating a logical flow in a desktop program called SAS Customer Intelligence Studio. Using Customer Intelligence Studio, a user can combine data-driven rules and analytical models to determine the right action for the customer.

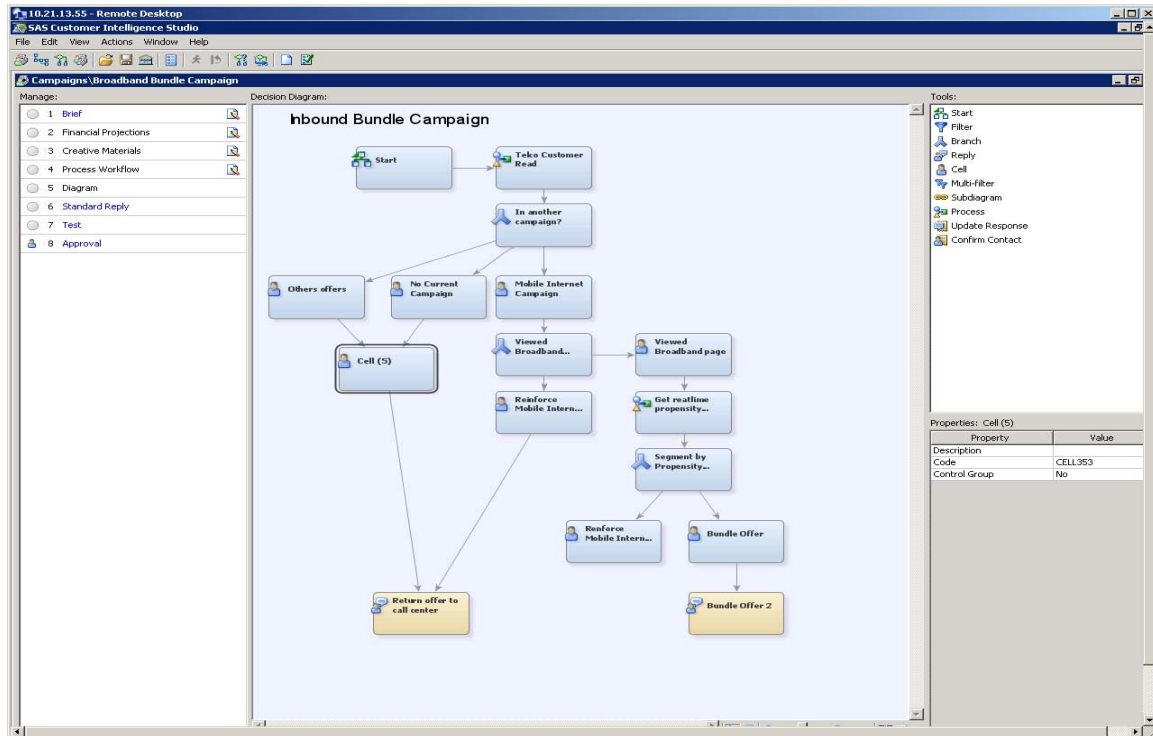


Figure 2: An example of a decision campaign

The logical flow is created as a diagram with series of nodes and branches that visually represents how a decision is made. The business user simply drags and drops nodes for specific tasks, such as getting customer data or executing an analytical model, onto a canvas and connects them to form the branches.

The diagram that is created is executed in real time to branch a customer down one path or another based on their profile, activity and preferences. The end result is a "segmentation of one" that represents the decision that is made about the customer and the type of communication they will receive on the Web site.

One of the key capabilities of Real-Time Decision Manager is that a business user can incorporate analytics into a decision without being an analytical user. The solution provides the analytical users the capability to register SAS code to be used in real-time decisions.

Although special macro code is appended before and after the code, the actual code, whether for predictive scoring, risk calculation, or value calculation, is standard SAS code and can be as simple or as complex as required. Once the code has been registered in the solution, it is made available to users using SAS Customer Intelligence Studio as an item available in the list of scoring processes.

As a result, the business user is able to use SAS code for a real-time decision without having to write SAS code themselves or needing to know the intricacies of the code.

REAL-TIME SESSION DATA-DRIVEN DECISIONS

The capabilities of SAS for Customer Experience Analytics and SAS Real-Time Decision Manager as part of the SAS Customer Intelligence solutions provide a powerful platform for implementing real-time personalization based on customers' session activities. SAS Customer Experience Analytics provides the capability to collect detailed session data about a Web visitor's session activities. This data then can be made available for the following:

- Offline data mining using tools such as SAS Enterprise Miner to identify significant patterns in customer's behavior and profile. These discoveries can be used either to develop predictive models or to create a decision diagram in SAS Real-Time Decision Manager.
- Make the customer state vector available to SAS Real-Time Decision Manager in real time so that it can be used to make decisions while the customer is still interacting with a Web site.

The last capability is a significant value in implementing Web personalization. While personalization can be done solely with historical data about the customer, the relevance of the personalization is diminished. This is due to the fact that any decision about the personalization is based on past activities and preferences, which might have changed recently. Also, historical data does not provide guidance on the current intent of the customer's Web interaction. As a result, accessing real-time session data of customer's Web activities in combination with historical data is extremely valuable to ensure that the personalization has the most relevance to a customer's current state.

WEB PERSONALIZATION AS PART OF A MULTICHANNEL STRATEGY

While Web personalization is a powerful marketing method, it might not meet its full potential if it is implemented independently from other channels.

Most businesses interact with customers using multiple channels in addition to the Web, such as call centers, direct mail, and retail stores. While businesses might manage these channels differently for organizational and technical reasons, customers view all of them as different facets of the same business. As a result, if the experience in one channel is different from another, or even contradictory, the benefit of a good experience in one of the channels is diminished.

For example, the Web site might be personalized to provide a targeted offer. This entices the customer to make a purchase, but then that customer might decide to call the call center for additional assistance. Once he or she reaches the call center representative, the customer mentions the targeted offer that was seen on the Web page. However, if the call center system and the Web site are not coordinated and don't share the data about the customer, the representative might not know about the offer and might not be able to assist the customer making the purchase based on the offer.

SAS Customer Intelligence solutions have the capabilities to coordinate customer interactions across multiple channels. The solutions share a common data model regarding customer interactions, such as what communication was given to a customer and what was their response. This data can be updated by different solutions such as SAS Real-Time Decision Manager, so that a unified single picture of customer interaction can be maintained. This data can also be accessed by the solutions as well so that it can be used to determine the right communication, whether it is outbound, inbound, or on the Web.

Finally, SAS Real-Time Decision Manager can make customer decisions not only for the Web but for other channels as well, such as call centers and retail systems. The solution is designed to be integrated with various systems and can provide decisions to those channels as well. Given the common data model and access to the real-time session data, Real-Time Decision Manager can in fact be used to ensure that any personalization conducted on a Web site is consistent with decision-driven interactions that occur in other channels.

OUTLOOK

While personalization is currently seen as a marketing method for the Web, it is likely to be adopted in more channels as gaining and maintaining customer interest becomes more difficult.

Personalization is already being adopted in e-mail, mobile devices, and IPTV since they share the same Internet and Web technologies as Web sites. Of these channels, mobile devices have the potential to provide even richer personalization than Web sites given that devices are location aware and are used by only a single person. As a result, as long as the customer opts in, a business can use information about the customer's past and current location to provide personalized content based on geographic location and preferences.

Personalization will also become more important in more traditional channels such as direct mail and call centers. With new technology both to manage and select customers as well as to create content (for example, print on demand), it is becoming easier and lower cost to create content that is targeted to a small group of customers (if not

for each customer). Even though these are traditional channels, personalized content will have the same advantage over generic content in having relevance to the customer and gaining their attention.

CONCLUSION

Web personalization is a powerful marketing method that can assist businesses in addressing common issues in reaching today's consumers. While it is difficult to gain customers' attention and their buying behavior is unpredictable, personalized content can provide the means to capture their attention. In combination with traditional marketing methods, it can provide businesses with the means to acquire, grow, and retain customers. But it is increasingly important to provide the same Customer Experience across all channels and touch points and not to limit the personalization to the Web channel. Customers expect the same treatment online, on the phone, and in the store.

SAS for Customer Experience Analytics and SAS Real-Time Decision Manager, two solutions in the SAS Customer Intelligence solution suite, provide the capability for businesses to implement analytically driven Web personalization that can span across more than just the Web site. SAS for Customer Experience Analytics is capable of capturing detail information about a customer's current Web session and retain a full customer history. This data can then be used for data analysis and to implement real-time decisions that are executed using SAS Real-Time Decision Manager across all channels. Customer Experience Analytics can also provide up-to-the-second information about customer sessions to Real-Time Decision Manager to incorporate it into real-time decisions.

SAS for Customer Experience Analytics and SAS for Real-Time Decision Manager helps you avoid the main reasons that can cause personalization to fail:

- Businesses cannot gather and analyze the right type of data about a customer's activity on their Web page.
- Businesses cannot integrate the consumer data captured on the Web with the data captured from other channels such as direct mail, store, or the call center.
- Businesses do not deliver relevant content to the customer.

REFERENCES

Aberdeen Group. 2007. "This Time It's Personal: Making On-Line Experiences Unique."

<http://www.aberdeen.com/summary/report/benchmark/4129-RA-unique-online-experiences.asp>

Lovett, John, with Carlton A. Doty and Emily Murphy. 2009. "Sharpening Web Site Relevance: Tactics for Delivering Meaningful Online Experiences. Forrester.com.

http://www.forrester.com/rb/Research/sharpening_web_site_relevance/q/id/53631/t/2

Penn, Mark, with E. Kinney Zalesne. 2009. "New Info Shoppers," *Wall Street Journal*, January 8, 2009.

<http://online.wsj.com/article/SB123144483005365353.html>

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Name:	Toshi Tsuboi / Olaf Kratzsch
Enterprise:	SAS Institute Inc.
Address:	200, SAS Campus Drive
City, State ZIP:	Cary, NC 27513
Work Phone:	+1.919.677.677.8000
E-mail:	toshi.tsuboi@sas.com / olaf.kratzsch@sas.com
Web:	http://www.sas.com/solutions/crm/index.html

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. © indicates USA registration.

Other brand and product names are trademarks of their respective companies.