

Paper 109-2012

Better, Consistent Customer Experience from Analytically Based Real-Time Decisions

Toshi Tsuboi, SAS Institute, Cary, North Carolina, USA

ABSTRACT

Consumer expectations from their interactions with business have increased tremendously. Today, they expect that businesses, armed with technology and customer databases, should be able to provide a relevant, consistent customer experience across all channels. Unfortunately, this is not often the case because data is underutilized, business processes are disjointed, and analytics are not leveraged to make the optimal decisions. As a result, customer loyalty and revenue opportunities are lost.

This presentation describes how organizations can use SAS® products, including SAS® Real-Time Decision Manager and SAS® Model Manager, to apply SAS analytics to improve customer experience by providing real-time analytic-based decisions to channels and business processes that drive consistent, personalized customer experiences. This presentation provides a how-to overview of the solutions and utilization examples.

INTRODUCTION

Do you get a sense that consumers are more demanding these days? If you are involved in a consumer-oriented business, you probably get a sense that consumers are never satisfied. You provide them with good products at a good price, and they still want something better. Most often, the demand is not just about being better and cheaper, but about uniqueness. And while you strive to provide them with what they want, if you mess up just once, they decide to tell everyone around the globe about it using Twitter and Facebook.

This change in customer expectations was foreseen back in 1999 by B. Joseph Pine II and James H. Gilmore in a book titled *The Experience Economy*. They described a new economy they called the experience economy, in which experience is the new currency. They argue that businesses must orchestrate memorable events for their customers, and that memory, or “experience,” becomes the product. If a business is more advanced in providing experiences, that business can begin charging for the value of the transformation that an experience offers. This, the authors argue, is a natural progression from the previous agrarian, manufacturing, and service economies.

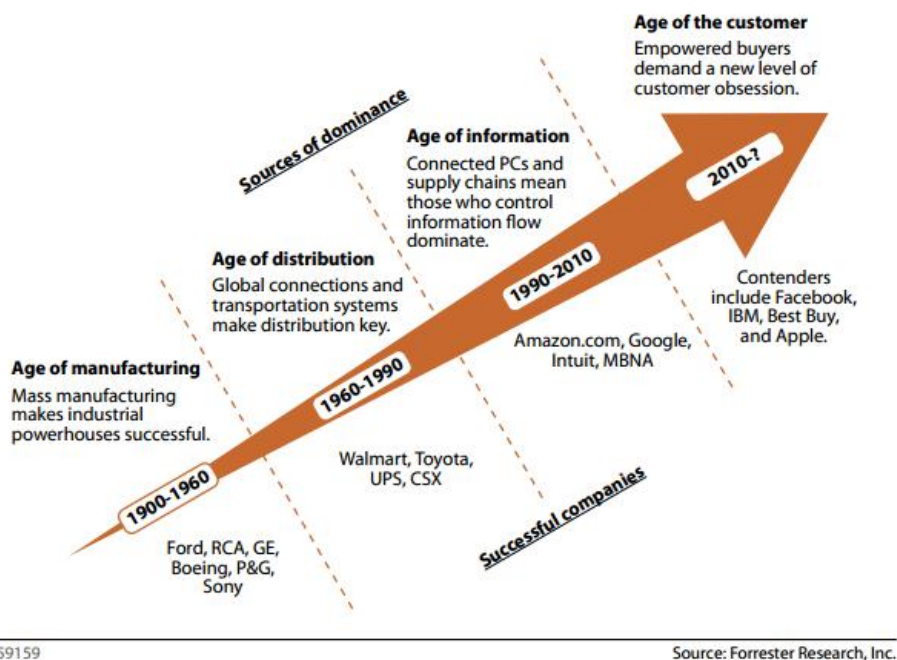


Figure 1 Evolution of the Customer

Better, Consistent Customer Experience, continued

Thirteen years later, a lot of their ideas have come to fruition. Even with the rise of energy and commodity costs, the cost for producing most products has decreased significantly. As a result, a product with a standard set of features and design is considered a commodity by consumers. In addition to the fact that these products produced and available in mass quantities, what consumers desire is the experience they gain from consuming the product or service. This experience is not only that of using a product such as a smart phone or an automobile, but also the incidental experience of purchasing the product or getting assistance.

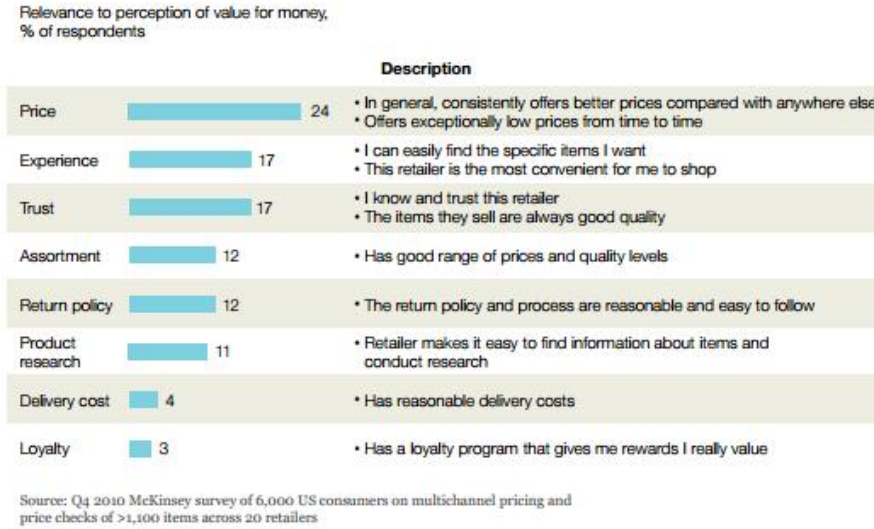
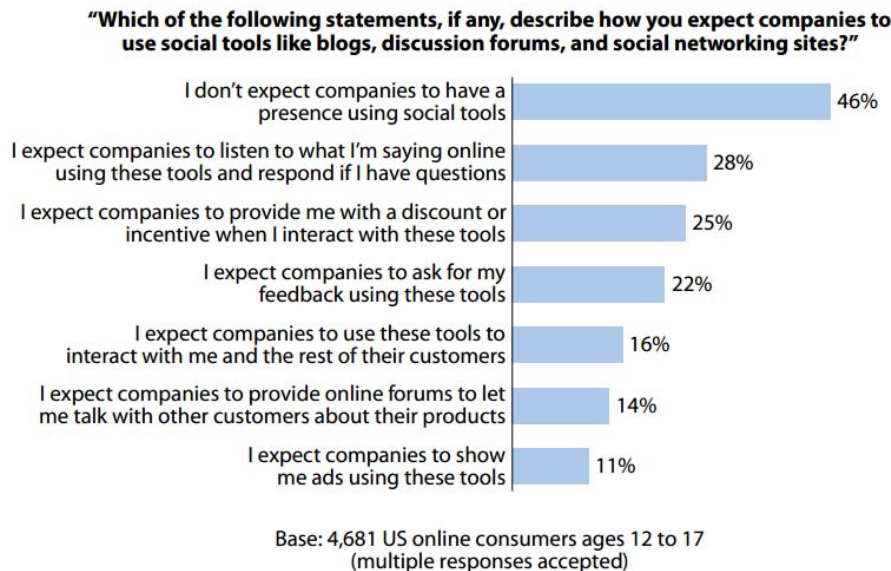


Figure 2 Experience Is One of the Highest Considerations for a Customer

Consumers also expect that businesses can deliver such experiences. They know that technology is available to keep track of their interactions with businesses by leveraging the prevalence in the use of Internet, mobile devices, call centers, and data marts. Although there is concern about the use of these technologies to violate privacy, there is also the expectation that businesses use these technologies so that they can identify customers and provide products and services that are relevant to them.



Source: North American Technographics® Youth Online Survey, Q3 2010 (US)

Figure 3 Example of Higher Customer Expectation of Companies to Use Technologies for Interactions

Some businesses can ignore this trend if they are intend to provide low-priced, low-quality commodities. For these businesses, profit is based solely on volume and there is no value for businesses to gain a customer's loyalty and trust. However, for most businesses, loyalty and trust are significant factors in customer acquisition and retention. As

Better, Consistent Customer Experience, continued

a result, there is significant pressure for each business to determine how it can provide the higher-level engagements that are desired by customers.

One way that enhanced engagement can be delivered is by developing a strong brand image. The success of many businesses such as BMW, Disney, McDonald's, and Nike can be attributed in some part to the strong brand image they have developed. Newer businesses such as Zappos, Google, and Amazon.com have also rapidly developed strong brand images by leveraging social media and other technologies. These businesses are rather diverse in terms of the products or services that they provide, but a common trait is that there is very little gap between the experience that they provide to the consumer and the product or service that they actually deliver.

So how can a business emulate these successful businesses to provide a level of customer experience that matches their product or service? One way is to intersect big data with real-time data.

BIG DATA + REAL-TIME DATA

The term *big data* is often used to describe the amount of data that is available to organizations. Most consumer businesses are encountering big data by accumulating significant amounts of data about their customers on a daily basis, such as their purchase patterns, activities on the business' Web site, social media activities, or calls to the call center. This provides the business with the opportunity to develop a better understanding of its customers. One way to that is to develop deeper insights into customers' profiles, behaviors, and preferences by using data mining to develop predictive models.

Predictive models can describe the likelihood that a consumer will take a particular action, such as making a purchase with a retailer, accepting an offer from a telecom company, or opening an account at a financial institution. These models can not only be used to predict acquisition or revenue opportunities, but also the likelihood of attrition of existing customers. The development of these models benefits significantly from big data because big data provides a larger consumer population and a larger set of criteria to mine and model with.

Of course, this process is not new for most organizations. Many have analysts who have developed models to assist in understanding the behavior of consumers. And with the rise of big data, many organizations that have not had such employees in the past are now looking for ways to develop such models, most often by using tools that provide these models without the use of analytical staff. As a result, more organizations have the ability to develop deeper insights regarding consumers and how they might respond to offers and products. However, after a company has predictive models, what should it do with them to enhance the customer experience? This is where the intersection with real-time data kicks in.

Real-time data is the flow of data captured from customer interactions as they occur. With the ubiquity of technologies that interact with customers, such as Web sites, kiosks, and smart phones, it is now possible to collect data from consumers both explicitly (via forms and purchases) and implicitly (via Web sessions and GPS). With these systems connected to networks, the data can be shared in real time with other systems. As a result, organizations now have access to whole new levels of details about consumers as they interact with each other.

Of course, real-time data is bidirectional. Any insights that are gained about the consumer can be leveraged in real time to enable a response while the consumer is still interacting. These offers can be more relevant because they can be targeted based on the current interest and status of the consumer. As a result, they have a much higher response rate than offers that are delivered in traditional out-bound marketing.

There are a few ways that the real-time data-based offers can be targeted. One is to simply use the information provided by the consumer, such as a change of address or the purchase of a product, and target offers and other content based on that information. In a sense, this is traditional marketing that uses the most up-to-date information about the customer. The second way is to look for trends in behavior. As customers interact with a business, they signal their preferences and concerns by way of their behavior. For example, someone interested in purchasing a TV might come to a Web site frequently and view various TVs. They might also come into a store and ask an associate for information. If these behaviors can be tracked and associated with a consumer, an opportunity arises to deliver content and promotions to that consumer the next time he or she visits the Web site, in order to entice that consumer to make a purchase.

The third way to leverage real-time data is to use the intersection with big data, where you use predictive models with the real-time data feed.

As mentioned previously, real-time data gives you access to what the consumer is doing now, and lets you target offers when consumers are most likely to respond positively. Big data gives you predictive models that enable you to determine the likelihood that a consumer will take particular actions, such as making a purchase. Combining the two gives you the capability to determine the likelihood that a consumer will take particular actions based on the most up-to-date data, and the ability to deliver at the exact time that they are most likely to respond positively. You can deliver

Better, Consistent Customer Experience, continued

the right offers at the right time in the right context, which has been proven to increase the response rate and optimize the value of each customer.

Given the benefit of combining real-time and big data, there are challenges that need to be considered by organizations that are implementing such an initiative. Some of these challenges are:

- How do you combine models with business logic to ensure that the offers and information that are being delivered take into account both the analytical insight from the predictive model and the business decisions regarding a consumer's segmentation and eligibility?
- After you develop a model, how do you deploy the model into operational environments such as Web sites and call centers before consumer behavior and taste changes and requires a new model?
- How do you collect consumer's responses to offers to help drive the refinement of both the predictive models and business logic?

SOLUTION FOR THE INTERSECTION OF BIG DATA AND REAL-TIME DATA

SAS Real-Time Decision Manager is a decision support solution that is designed for the intersection of real-time data and big data to deliver the best decisions that drive customer experiences. This solution provides the following capabilities:

- makes analytically based intelligent decisions. Predictive analytics provides the insights into customers' behavior, and decision logic takes into consideration business factors such as marketing considerations, eligibility rules, and contact policy. SAS Real-Time Decision Manager enables you to combine both for the best decisions regarding customer contact.
- operationalizes decisions. SAS Real-Time Decision Manager enables the deployment of analytically driven decisions into multiple real-time, operational environments for consistent and optimal decisions that are based on historic and current interactions.
- closes the loop. As part of delivering the real-time decisions, SAS Real-Time Decision Manager can collect information about the contact and response patterns of the consumer to those decisions, and then that information can be used to further refine marketing efforts.

SAS Real-Time Decision Manager alleviates the need to embed decision logic in operational customer-facing systems such as Web sites and call centers. The solution provides a single repository for decision processes that can be interconnected with systems via industry-standard Web service interfaces. This means that decision logic, which might change frequently, is isolated from the touch-point applications, and the need to make costly changes to customer-facing applications is removed. The single repository also provides a robust framework that ensures that the same criteria are used to create consistent communication with and treatment of customers across channels, products, and business units.

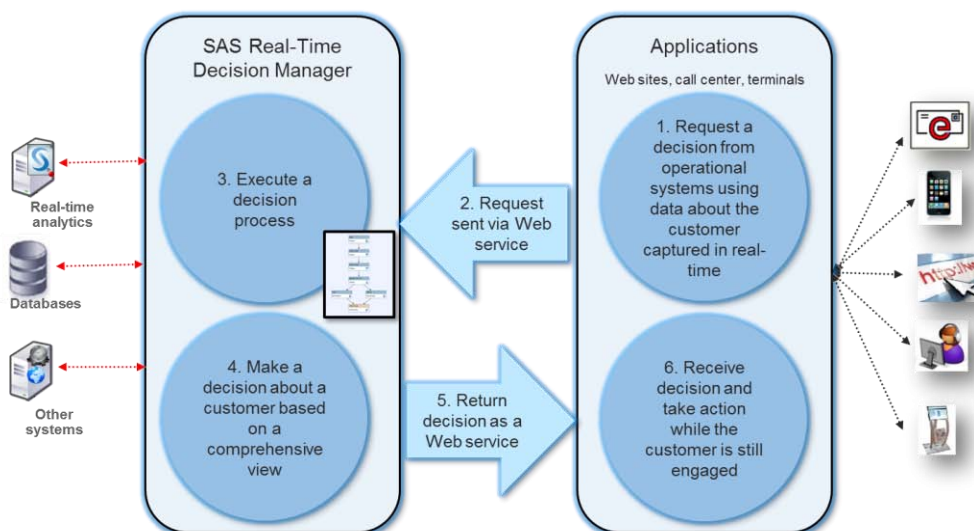


Figure 4 Process of a Typical SAS Real-Time Decision Manager Decision

Better, Consistent Customer Experience, continued

In a call center environment, for example, SAS Real-Time Decision Manager can deliver intelligence-based guidance for the representatives. When customers call the organization, they provide new information, either explicitly (for example, "I am interested in a new product") or implicitly (through their emotional state), which is captured by the representative. The representative might then make a request to the call center application about what offer to provide to the customer, based on the current situation. At that point, the call center application makes a request to SAS Real-Time Decision Manager, which incorporates the newly captured information. SAS Real-Time Decision Manager then makes an intelligent decision about the offers and sends that information back to the representative via the call center application.

DRIVING REAL-TIME DECISIONS USING ANALYTICS

Analytics combined with decision logic enables organizations to make the best possible decisions about the customer. Although decision logic enables organizations to capture factors that are fundamental to making a decision, analytics can provide deeper insights for even better decisions. SAS Real-Time Decision Manager combines decision logic with analytics driven by the SAS®9 platform to provide better customer decisions.

Models for deployment by SAS Real-Time Decision Manager can be developed using SAS analytical modeling tools such as SAS Enterprise Miner. Any code developed with these tools can be deployed by SAS Real-Time Decision Manager if that code uses valid DATA step fragment. As a result, any code that has been developed for predictive scoring can be deployed into operational environments, with modifications.

The resulting model is then registered with SAS Model Manager. SAS Model Manager provides a framework for the following tasks:

- organizing and tracking the tasks of model development
- verifying and testing models
- benchmarking the performance of comparative models
- deploying models into production environments
- publishing and sharing model performance data through established reporting channels
- retiring models from production status

Within SAS Model Manager, models for real-time use are treated identically to SAS models for other uses. They are managed within SAS Model Manager as a project, which can then be published and made available for use by SAS Real-Time Decision Manager. By publishing the model as a project, the SAS Model Manager user can refresh the model with a new version without impacting the operation of SAS Real-Time Decision Manager.

COMBINING ANALYTICS WITH BUSINESS LOGIC

After the model's project has been published, the model is made available in SAS Customer Intelligence Studio, the application that the decisions are developed in. The application provides an interactive graphical interface for designing the decision as a campaign that enables users to track how a decision regarding the segmentation and eligibility of a customer is made. Users can visually and intuitively design a decision without having to codify them into cryptic programming and rules.

Because the campaign is similar to a flow diagram, you can construct the decision process that intuitively represents how a person might make that decision. You construct a diagram by connecting nodes. The nodes are available in a pallet and can be dragged, dropped, linked, and configured to construct the diagram.

Better, Consistent Customer Experience, continued

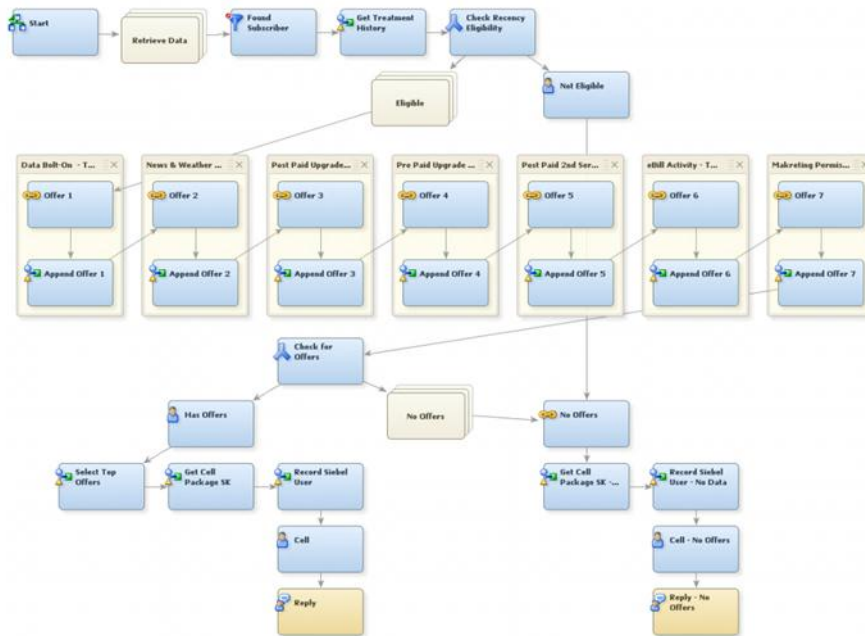


Figure 5 Example of a SAS Real-Time Decision Manager Campaign

A single start point, or Start Node, represents the beginning of the decision, and is the first node that is executed when a decision is requested by a customer-facing system. The Start Node is then followed by a series of nodes.

Some of these nodes are used to determine which branch to follow in a diagram, based on attributes associated with the customer such as demographics, behavior, or segmentation. One such node is the Score Node, which represents the model that was published by SAS Model Manager and which can be used to generate a predictive score about the customer. As with other nodes, the Score Node can be selected and added to the diagram. When the node is configured, all models published by SAS Model Manager are displayed in a list. All you need to do is select a model from the list to use any of them. As a result, the diagram designer is able to use predictive models in an operational business decision without having to know any details about the actual analytics.

Other nodes can be used to get the following additional data about the customer from other systems and databases:

- historical data (past interactions, profiles, preferences, and so on)
- market factors (product inventory, prime rate)
- results of past interactions with the customer

This data can be accessed either through a Web service or through standard database queries. The data can be used by both business logic and models to provide intelligent decisions during each interaction.

At the end of the branch a Reply Node is used to specify the decision that is made about the customer and that will be returned to the customer-facing system. One type of decision that can be constructed is a next best action, for which all actions that might be applicable to a customer, such as presenting offers or suggesting service upgrades, are determined. The benefit of next best actions is that the communication that is delivered to the customer is the most appropriate for the customer at a specific time and circumstance. In the Reply Node it is possible to execute multiple mini-campaigns, called treatment campaigns, to determine a customer's eligibility for a large number of actions. The treatment campaigns provide the benefit of creating and managing the decisions for one set or a small set of offers separately from other offers; products, brands, or divisions can manage their offers independently. After the actions have been selected, they can be sorted by priority, and then the top actions that will have the most impact on the customer are delivered as part of the decision.

When the process logic is constructed, it can be tested within the same interface, which prevents the risk of errors occurring before the processes are deployed into operational environments. The tested flow can then be set up in a test environment, which verifies that the process completes in a timely manner that will not affect the customer experience. As a result, users can implement strategic decisions without specialized IT skills, and organizations can implement decision strategies that are as simple or as complex as needed. After the diagram has been completed and tested, it can be deployed into an operational environment.

Better, Consistent Customer Experience, continued

The integration of SAS Model Manager and SAS Real-Time Decision Manager ensures that the best models for customer decisions are deployed quickly, in the right context, by the people who have the best knowledge of the customers and the inbound marketing strategy, and in the right infrastructure to support execution of the models in a high volume, high-performance environment. SAS Model Manager guarantees that the best models for customer decisions are developed, verified, and deployed into the operational environment. This integration reduces the IT resources required to rapidly deploy customer strategies to channels, but still ensures that critical customer interactions are implemented correctly.

MULTI-CHANNEL COORDINATION

A successful real-time decision strategy requires integration and coordination with other systems, because precise decisions cannot be made without a 360-degree view of the customer. Such a view requires not only integration of all customer-facing systems and enterprise systems, but integration with outbound communications such as e-mail and direct mail. Successfully addressing these issues not only provides the right customer interaction, but also helps reduce costs and risks. SAS Real-Time Decision Manager is a SAS Customer Intelligence solution, and shares common components with other solutions such as SAS Marketing Automation, which is a solution for targeting outbound communications using SAS analytics.

One component that is shared between SAS Real-Time Decision Manager and SAS Marketing Automation is the common treatment repository. The repository stores any treatments that might be delivered inbound by SAS Real-Time Decision Manager, outbound by SAS Marketing Automation, or by both. This not only provides a single place to manage multi-channel offers, but also enables the use of the common customer data model, which is another component that is shared between solutions. The common customer data model is used for recording customers' contacts and responses to offers. Both solutions can record contact and responses, and can access the same records that might have been updated by the other solution. The data not only helps make the right decisions, but also enables the determination of the effectiveness of your strategy and helps determine how to interact with customers in future sessions.

PERFORMANCE TO MEET CUSTOMER EXPECTATIONS

Addressing the new customer expectations requires analytics-driven real-time decisions to drive the customer experience. Even with advanced decision making, a significant delay in making a decision, or not making any decision at all, can have significant negative impact on customer experiences.

SAS Real-Time Decision Manager has been designed with high volume, low latency, customer-facing environments in mind. The model code that has been deployed with the diagram is executed entirely within SAS Real-Time Decision Manager, which is designed to execute SAS code in high-performance operational environments without the additional overhead of calling other systems. SAS Real-Time Decision Manager supports the deployment of multiple instances of SAS Real-Time Decision Manager servers to match the transactional profile of an organization's decision request. These servers can be clustered to provide failover and load-balancing capabilities, enabling the solution to provide precise and timely request processing.

CONCLUSION

Consumer expectations have changed dramatically in the last few years. Even though the changes were expected, the pace and the degree of change often were not. As a result, businesses are trying to adapt to these changes quickly in order to deliver the personalized experiences that are demanded by customers. Big data and real-time data provide these businesses with the opportunity to implement these changes. However, businesses often lack the capabilities to use them effectively.

SAS Real-Time Decision Manager with SAS Model Manager provide the capability to use big data and real-time data to deliver real-time, analytically driven decisions that deliver targeted, personalized customer experiences. Predictive models can be combined with business decisions by business users to implement the best decisions to inbound, customer-facing channels. These decisions can be deployed rapidly to the channels and made operational to meet the performance demands of these channels.

REFERENCES

Bernoff, Josh. June 6, 2011. "Competitive Strategy In The Age Of The Customer: Only Customer-Obsessed Companies Can Survive Disruption." *Forrester Research*.

Helbling, Jeffrey, Josh Leibowitz, and Aaron Rettaliata. May, 2011. "The Value Proposition in Multichannel Retailing." *McKinsey Quarterly*. Available at https://www.mckinseyquarterly.com/Marketing/The_value_proposition_in_multichannel_retailing_2800.

Better, Consistent Customer Experience, continued

Anderson, Jacqueline. March 1, 2011. "Understanding The Intricate Digital Behaviors Of Young Consumers. -An Empowered Report: How To Reach Young Consumers." *Forrester Research*.

CONTACT INFORMATION

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

Toshi Tsuboi
SAS Institute Inc.
SAS Campus Dr.
Cary NC 27513
Phone: 1.919.677.8000
Fax: 1.919.244.4530
E-mail: toshi.tsuboi@sas.com
Web: www.sas.com
Twitter: [ttoshi](https://twitter.com/ttoshi)

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.