Chapter 2
Service Timing: Designing and Executing Service in a Dynamic Environment

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Abstract Service managers and researchers have long recognized that service timing is critical. Studies of how waiting time and reliability are important to customers and service firms began more than 50 years ago. Current research explores how customer engagement, co-production and co-creation unfold over time. This article reviews prior research and models of the dynamics of service timing that have emerged. It argues that service timing and its nuances are neglected by managers and researchers. Notably, customer service experiences are often embedded in rich social and emotional contexts, mediated by technology, and evolving across different service channels, platforms and locations over time in ways that are not well understood. Fortunately, rich individual-level business-to-customer and customer-to-customer data offer exciting opportunities to advance our knowledge of the dynamics of service experiences. This chapter reviews what is known (and unknown) about service timing and suggest specific research questions, opportunities and challenges.

Keywords Service design · Service innovation · Service operations · Customer experience · Service experience · Customer relationships · Service encounters · Dynamic models

2.1 Service Timing Is Critical

Recently, service managers and researchers have emphasized the importance of the customer journey with a firm, defined as the customer experience over time and across touchpoints (Lemon and Verhoef 2016). This perspective has focused attention on how customer experiences unfold over *time*—that is, on the dynamic nature

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of the customer experience and journey. Yet, it is easy to argue that the core of service science has always focused on customers' experiences over time. A vast stream of research across multiple disciplines considers service quality as arising from three underlying processes—the quality production process, the quality experience process, and the quality evaluation process (Golder et al. 2012). For example, waiting time is fundamental to how service operations are managed (e.g., Aksin et al. 2007) and reliability or consistency over time is considered to be a major ingredient in customers' perceptions of service quality (e.g., Brady and Cronin 2001). Why then, after more than 50 years of research (Jacoby et al. 1976), are service managers and researchers emphasizing (yet again) the importance of understanding how service experiences unfold over time?

One important reason for a renewed interest in service timing is that firms have vastly greater capabilities to interact with customers over time in the modern business environment when compared with the past. Due to advances in technology, customers and firms interact at multiple service touchpoints, as well as via digital and social media platforms. These customer-firm interactions can take place at different locations and times, as well as when the customer is mobile and using a smart device. Moreover, the internet of things (IoT) has led to "smart products" that deliver localized, real-time services. The popular business press is replete with reports of novel services: people managing services in their smart homes; robots that replace self-service kiosks in restaurants and health workers in nursing homes; field service representatives who rely on information from sensors embedded in on-site equipment; and healthcare advances that leverage analytics and smart medical devices.

Service timing has renewed importance because, with this bewildering array of new opportunities, how will firms "connect the dots" to create service experiences that unfold over time in ways that are meaningful and valuable to customers?

2.1.1 Some Questions About Service Timing

In this exciting new business environment, service science is wrestling with many new challenges. A few examples:

1. How can firms deliver on the promise of service personalization? Despite improvements in leveraging pertinent information about customers, firms' ability to deliver relevant products and services to consumers is still a promise—not a reality. These challenges are especially great when customers are using mobile devices.
2. How can firms create a seamless service experience that is consistent over time and across channels—and authentic? There is an increased prevalence of RFID tags, smart appliances, wearables and the promise of a "network of devices," but firms are typically managing discrete service encounters (i.e., isolated interactions), not holistic experiences that match customer needs.

3. How can firms leverage two-way communications to collaborate in the creation of customized service experiences for their customers? Firms seek "customer engagement"—that is, interactions that are not purchases that deepen customer-firm relationships—and they are communicating with customers in many ways (Van Doorn et al. 2010). For example, firms can provide active recommendation systems that explicitly obtain inputs from customers. However, most communications are one-way not two-way—and they seldom leverage the history of the customer-firm relationship.
4. How can firms better utilize geo-targeting (via GPS) to reach the right customer at the right time and place? Mobile devices (smart phones, wearables etc.) allow firms to interact with customers anywhere at any time. Thus, firms' management of service timing implies a capability to reach the customer at the right place, as well.

2.1.2 Are We in Danger of Over-Simplifying?

There is a very great danger that managers will tackle tomorrow's service challenges with yesterday's tools. When we examine how firms have usually designed and implemented service, any consideration of timing is noticeably absent. Certainly, service companies usually attempt to deliver fast and responsive service (Bolton and Drew 1992.) However, these efforts do not improve the consistency of service for the individual customer. For example, quality improvement tools, such as the "six sigma" approach to reducing service defects or failures, typically analyze cross-sectional data rather than data that reflect an individual customers' experience over time (e.g., Antony 2006). This approach identifies certainly identifies out-of-control service processes—but it fails to consider the process from the viewpoint of the individual customer at a particular point in time.

New technology has brought a harvest of "big data," but (sadly) the data pool is often a mile wide and an inch deep. Service managers and researchers need "deep data"—a fusion of relevant longitudinal data from many sources—to understand and improve customer experiences (Kramer et al. 2004).

2.1.3 What We Know: Timing Matters

Our lack of knowledge about service timing is rather surprising given that thought leaders have defined service experiences as *process*-based consumption over time, not outcome-based consumption. For example, Grönroos (1998, p. 322) emphasizes that "A central part of service marketing is based on the fact that the consumption of a service is process consumption rather than outcome consumption." Empirical work has reinforced the point. For example, studies have shown that, when customers experience repeated service failures ("double deviations"), they are more likely to

attribute blame to the firm and its recovery efforts are less likely to be effective (Maxham and Netemeyer 2002). In contrast, repeated favorable service encounters increases the likelihood that a customer will repurchase from a service firm (Bolton et al. 2006).

The preceding discussion highlights how customers' evaluate service experiences holistically, rather than judging discrete service encounters. It also implies that customers take a longitudinal perspective with chronological order, rather than a considering a "service snapshot" at one point in time that ignores path dependencies. For this reason, service timing must inevitably take into account all dimensions of customer-firm relationships.

In both the service management and customer relationship management literature, theoretical and empirical work has shown that managing variability over time in individual customers' service consumption increases their satisfaction, loyalty and cross-buying (e.g., Bolton and Lemon 1999; LaBarbera and Mazursky 1983). Recent research has gone a step further and shown that strategies which decrease variability in service consumption processes also improves firms' overall financial performance (Tarasi et al. 2011, 2013). Empirical support for these findings has been demonstrated across three settings: telecommunications, financial and logistics services. Moreover, these strategies are demonstrably actionable by most service managers. For example, improving consistency in service increases a firm's customer satisfaction levels, increases its cash flow levels and decreases risk.

2.1.4 What We Don't Know: How to Manage Service Over Time

Over many decades, service science has made considerable progress in understanding how customer experiences unfold over time, especially how customer attitudes and behavior change (e.g., Bolton and Drew 1991; Bolton 1998). However, using this knowledge to manage service timing is challenging. To understand the managerial challenges, it is useful to consider a few illustrations of what is known about the important role of time in designing and executing superior service experiences for customers.

- Customers perceive improvements in service performance, but their overall perceptions of service quality are stable and change slowly over the long run (Bolton and Drew 1991).
- Customers have a confirmatory bias—that is, their perceptions of service quality are influenced by their prior expectations—thereby creating a "double whammy" effect on service quality (Boulding et al. 1999). This phenomenon may be one reason why a service firm's reputation or brand equity is a source of competitive advantage.
- The chronological order of service encounters influences customers overall evaluations of their experiences. Customers prefer a happy ending—that is, a

negative event followed by a positive event—rather than the reverse (Ross and Simonson 1991).
- Customers prefer service brands that are "pioneers" (i.e., first-to-market) as well as service brands that they experience first—especially when service attributes are alignable (Carpenter and Nakamoto 1989; Niedrich and Swain 2003).

Researchers have begun to consider more complex scenarios, but their work is still at the conceptual stage (e.g., Sivakumar et al. 2014).

These findings are useful *if we assume that firms manage the timing of service encounters*, so that they can control when and how customers acquire information and learn (through experience) about service offerings. Unfortunately, this assumption is often unrealistic—especially in today's technology-infused marketplace. Customers are active co-creators of the value derived from service experiences, and their active participation has important implications for service timing.

2.2 Service as a Dynamic Process: Co-created Over Time

To understand service timing, service scientists must start from a value co-creation perspective. Lusch and Vargo (2006, p. 284) argue that "value can only be created with and determined by the user in the 'consumption' process and through use or what is referred to as value-in-use." Co-creation "involves the [customer's] participation in the creation of the core offering itself. It can occur through shared inventiveness, co-design, or shared production of related goods, and can occur with customers and any other partners in the value network." From this perspective, the firm does *not* design and deliver service to customers at one or more specific points in time. Rather, customers co-create value with the firm through many interactions over time—where both customers and firms are a 'source of competence' (Prahalad and Ramaswamy 2000, 2004). Customers and service providers are dynamically adjusting their behavior as the service experience evolves.

Customers engage in spontaneous, discretionary behaviors over time that uniquely customize the service experience. The nature and extent of their participation is influenced by their goals, role clarity and capabilities (Bolton and Saxena-Iyer 2009). In a business-to-business (B2B) context, value co-creation might entail customer and supplier teams jointly designing and executing high technology, interactive services over a period of many years. In a business-to-consumer context (B2C), value co-creation might entail a patient and his/her medical team developing and executing a treatment plan that improves his/her health. As these examples illustrate, the customer often plays a proactive role in the design and execution of the service experience over time—interacting with the firm's employees, technology and other aspects of the servicescape.

Since customers interact with the firm's technology, people and processes in the creation and delivery of services, customer participation and co-creation directly influences service processes, customer outcomes (e.g., service quality and service

usage levels) and firm outcomes (efficiency, effectiveness, revenues and profits). Consequently, effective service timing is necessary to create value for customers and firms.

2.2.1 What Happens When the Customer Is In Charge?

Customers co-create value to achieve their goals. Their appraisal of the means to achieve a goal requires the integration of their expectations, beliefs and perceptions (Bagozzi and Dholakia 1999). Conscious goals influence attentional mechanisms and how customers interpret cues during service encounters (Tarasi et al. 2017). A customer assesses his/her progress towards a goal and then adjusts his/her behavior accordingly. For example, he/she might choose to share information with the firm or change his/her behavior to improve the service process and outcome. Since customers are active goal-seekers, a customer has (if he/she chooses) a great deal of control over service timing. Unfortunately, putting the customer in charge doesn't ensure "good" service timing or a superior service process or outcome (e.g., Chan et al. 2010). It is enlightening to consider a few examples of how people's preferences and behavior depend on service timing.

- *Impulse versus Habit*. People may act impulsively based on their desires but, at other times, they are able to overcome their desire through willpower or self-control (Hoch and Loewenstein 1991). For example, a customer may spontaneously purchase a product that is environmentally unfriendly but h/she may also habitually use recycling services (Lindenberg and Steg 2007; Sheth and Venkatesan 1968). Two major reasons for impulsive behavior are that customers' self-control can be depleted and it can be undermined by conflicting goals and standards, as well as by failing to monitor their own behavior (Baumeister 2002). Hence, the timing of consumer's purchase and consumption of services will sometimes be unpredictable to the firm.
- *Preferences Depend on Circumstances*. Customer preferences seem inconsistent over time because they change as circumstances vary. Indeed, customer preferences can be considered to be constructed (Slovic 1995). For example, the importance weight of a service attribute in determining overall satisfaction with an offering varies over time (Homburg et al. 2006; Lohse et al. 2000; Mittal et al. 2001). Hence, predictive analytics that seek to design and deliver services must take into account the customers' circumstances at a specific point in time.
- *Context can Magnify or Diminish the Importance of Service Attributes*. Customers' beliefs and behaviors are influenced by contextual factors that alter their perceptions of service attributes and perceived risk (Levin et al. 2002; White et al. 2011). Contextual factors can include consumer goals and touchpoints. For example, customers pay more attention to hedonic service attributes when they are browsing than when they are searching; ease of finding products is important

when customers shop in online stores but it is less important when customers shop in a traditional store (Tarasi et al. 2017).

- *Faulty Judgments*. People make estimates (e.g., about waiting or travel time) using an anchoring and adjustment process. However, they make insufficient adjustments and tend be over-confident in their accuracy (Block and Harper 1991; Epley and Gilovich 2006; Yadav 1994). Hence, they are unlikely to make accurate predictions about the timing of their own actions or a service firm's actions.
- *Self-Serving Bias*. Customers exhibit a self-serving bias such that they are more satisfied when they participate in service delivery when all else is equal (Bendapudi and Leone 2003). They are likely to attribute successful outcomes to their own efforts and unsuccessful outcomes to the firm's efforts.

Given these findings, it is not surprising that—when customers have a large number of choices—they are more likely to make unsatisfactory decisions (Scheibehenne et al. 2010). However, service researchers do not entirely understand when customers will make good versus "bad" (i.e., sub-optimal) decisions about services.

A key recommendation for service firms is that they should attempt to align their goals with the customers' goals to achieve service excellence (Bolton 2016). In this way, they can collaborate with customers by providing resources and capabilities that help them achieve their goals. However, this strategy will only be successful—for both firms and customers—when service firms master service timing.

2.2.2 The Timing of Small Details Can Make a Big Difference

Based on the preceding discussion, some readers may surmise that effective service timing is difficult to achieve—and its consequences for customers and firms must be difficult to observe. However, effective service timing is a sustainable competitive advantage for some firms. A recent study of successful firms gives many examples and argues that a small detail—i.e., a specific attribute of a service experience such as a sensory input, a discrete emotion, a process element, or an employee action—*that is non-alignable with competitive offerings* has the potential to favorably differentiate service offerings in the marketplace (Bolton et al. 2014). Non-alignable means that "the small detail cannot be directly compared with competitive offerings along a common dimension and has the potential to favorably differentiate the offering" (p. 255). Note that the timing of a service offering is, by its very nature, non-alignable.

An illustrative example is provided by Marriott International, Inc. Its core values include the pursuit of service excellence through "small details" (http://www.marriott.com/culture-and-values/core-values.mi). In the hospitality industry, there are a many discrete service encounters that create the (holistic) customer experience. Each encounter is an opportunity to emotionally engage the customer—often with a

human touch. For example, during evening "turn down service," a maid might fold a towel in the shape of an elephant and place it on the bed—thereby delighting a small child when he or she returns to the room at bedtime. The timing of small details must match customer needs to deliver a superior experience. In this instance, both the parent and child enjoy a special moment during their bedtime ritual.

When timing is "off," the service experience will be unsatisfactory. Most people can easily recall instances when service came as a disruption rather than a benefit. For example, small business customers welcome one-on-one service from a supplier, but not when the representative interrupts their attempt to serve their own customers. Many people enjoy a firm's humorous online video shared by a friend, but dislike any interruption or delay if the video is shown when they are pursuing other goals online.

Traditional approaches to service quality encourage firms to focus on service attributes that are similar across service encounters for both the firm and its competitors. The service firm's goal is to raise average service quality levels and deliver consistent (low variance) service. In contrast, small details that contribute to service excellence must fit with customer needs at a particular moment in time—recognizing what has taken place previously during the customer journey (Bolton et al. 2008). Service timing—designed to fit the customer's context—becomes critical.

Almost all service firms can leverage service timing. In the next section, we will consider four managerial decisions that involve service timing and discuss some of the considerations that might influence how services are designed and executed.

1. *Market segmentation based on time*: how cohort and maturation effects influence the design and execution of services
2. *Designing service encounter sequences over time*: aligning service encounters with customers' current goals
3. *Customer relationship management over time*: how customers different social identities are evoked during different service contexts
4. *Executing service experiences over time*: allowing for customer participation in the design and delivery of service

2.3 Market Segmentation Based on Time

When thinking about the timing of service experiences, it is helpful to begin with the long (temporal) view. Who is the customer and what has been his/her journey to this point in time? Managers often avoid any consideration of service timing and fall back on cross-sectional thinking: classifying customers into groups with different needs. Thus, most market segmentation schemes group customers using cross-sectional lifestyle and demographic variables rather than considering customers' needs, preferences and behavior *over time*. However, the distinction between cross-sectional *differences* and longitudinal *responses* is fairly intuitive, as the following example illustrates.

A recent *New York Times* article announced that Generation X, who were born during (roughly) 1962 to 1971, are now experiencing their peak earning years and they "are finding they are not doing as well as they might have expected" (Gebeloff 2017). The article went to distinguish between two different phenomena: maturation (life stage) effects and cohort effects. With respect to life stage, "people 45 to 54 are more likely than others to say they are satisfied with their financial situation" regardless of when they are born. However, the article pointed out that, unlike other cohorts (such as the Baby Boomers), Generation X has consistently expressed dissatisfaction with their economic circumstances regardless of their life stage.

This distinction between cohort and maturation effects over time seems fairly intuitive, but managers have often confused them. Unfortunately, their differences are very important when segmenting and targeting markets to design and deliver interactive services, as well as social and digital media campaigns. For example, many firms are targeting Generation Y (Gen Y) members or Millennials, which are the cohort born (roughly) between 1981 and 1999. A key formative characteristic is their early and frequent exposure to technology; this generation relies heavily on technology for entertainment, to interact with others—and even for emotion regulation. Gen Y members are sometimes called the "Me Generation" because research indicates that narcissism (exaggerated self-perceptions of intelligence, academic reputation or attractiveness) in Gen Y college students is higher than in previous generations of students (Trzesniewski and Donnellan 2010; Twenge et al. 2008).

By definition, a cohort should exhibit systematic differences in values, preferences *and behavior* that are *stable* over time. However, many characteristics commonly ascribed to Gen Y—especially regarding their heavy social media usage when compared to other cohorts—may not be due to their cohort, but rather due to their life stage (Bolton et al. 2013). Most studies of Gen Y examined their social and digital media usage during their high school and college years. There is much less evidence regarding their media usage after they enter the workforce and begin raising a family. Hence, it is dangerous to rely on stereotypes about Gen Y preferences and behaviors regarding services unless the firm distinguishes between cohort and life stage characteristics. Ultimately, the challenge is to distinguish between stable versus time- or context-dependent preferences or behaviors.

The solution to this dilemma is a return to basic principles regarding market segmentation and why it is profitable. Market segmentation is *not* a strategy that involves dividing a broad target market into subsets of consumers who have common need and priorities and then designing and implementing strategies to target them. Instead, it is a process of aggregation—service firms should group together customers who *respond* similarly to actionable variables. Hence, it is important to understand how customers' will respond to service attributes during their specific circumstances at a point in time.

Customers frequently complain that direct marketing activities, such as recommendation systems or personalized advertising, seem poorly targeted. For example, Amazon might recommend a book that you have already read or Facebook serves up an ad for a product or service previously purchased. The primary reason is that the marketers are frequently targeting customers based on "what people like you have

purchased" (i.e., cross-sectional information) rather than leveraging information about the individual customer's preferences or past purchases. Customer relationship management is effective, but—too often—it relies on cross-sectional data and targets customers who are currently profitable rather than longitudinal data that could grow the profitability of customers (Reinartz et al. 2004).

This issue is critical for service firms as they design and execute interactive services—including location-based, retail and self-service technology—as well as develop digital and social media campaigns. What are stable cohort characteristics versus life stage (maturation) characteristics versus time- or context-dependent preferences and behaviors of consumers? The answer to this question requires research that investigates customer preferences and behaviors regarding services. There are no short cuts; service firms need to understand customers' goals, their expectations regarding service, their attitudes toward privacy, their trust (or lack of trust) of service brands, their social and digital media usage patterns and their offline behavior over time. For example, since Gen Y members are highly sought by many service firms, it is useful to consider the following questions:

1. Do Gen Y customers who recommend (or denigrate) a service brand in social media subsequently buy (or boycott) the brand? The answer to this question requires tracking customer behavior across touchpoints—rather than a fragmented view based on a single touchpoint.
2. What are the real-time and long-term influences of word of mouth generated in social media by Gen Y members on *other* members' purchase behaviors, both online and offline? The answer to this question requires a deeper understanding of how people interact with each other over time (i.e., organic word of mouth) rather than how they respond to earned media.
3. How can firms (or public policy makers) use elements of games or play to engage with Gen Y members online, build relationships with them over time and ultimately influence their behavior? The answer to this question requires managers to consider customers many different goals within and across service encounters: contributing, sharing, consuming, searching, participating, or playing (Schlosser 2005; Shao 2009).
4. What service attributes will Gen Y members value as they move through different life stages? Service firms know a great deal about Gen Y's media habits, but much less about its values and enduring behaviors. The answers to this question are likely to be context-specific and depend on service firm's offering, its touchpoints and its markets.

2.4 Designing Service Encounter Sequences Over Time

Service firms seek to design and execute service that matches their brand promise—which implies a consistent customer experience across service encounters that take place at different touchpoints. This goal is challenging because firms usually don't have comprehensive view of the customer journey—across multiple service

encounters—because it unfolds online and offline, through interactions with multiple actors, replete with positive and negative emotional and sensory stimulation.

Given these limitations, service managers and academics have often chosen to simplify the service encounter sequence. For example, retailers traditionally viewed shopper behavior in terms of a "purchase funnel" whereby customers (sequentially) browse, search, buy, re-purchase and (perhaps) make a recommendation—despite a reality that is far more complex (Shankar 2011). Hotels often considered a service encounter sequence such as: check-in at a desk, visit room, patronize restaurant, request wake-up call, and so forth—although some innovative hotels have eliminated all these services! However, if we assume the customer is in charge, there are many possible service encounter sequences. For example, retailers now worry about showrooming and webrooming, as well as the use of mobile devices within the store (Mehra et al. 2017).

Consequently, service managers and researchers are challenged to create a (holistic) superior customer experience that encompasses these encounters. Consider some of the issues facing a global service provider.

1. What is important to a particular customer and how does it change across channels, service activities and market contexts? For example, what service attributes are salient to the customer in an encounter that takes place on the customer's premises versus on the firm's premises versus on a website versus via a mobile app versus through a catalog?
2. How should firms design and deliver service when a customer has different emotions, expectations, resources, capabilities and prior experiences at different points on the customer journey—and there is also heterogeneity across customers? For example, customers will have different understandings of their role in co-creating service (e.g., outsourcing the entire task versus a portion of it), as well as different capabilities to participate. How do these differences magnify or diminish the importance of different service attributes?
3. How should firms manage the service experience when a consumer's journey involves different goals (e.g., browse, search and buy) that take place within and across multiple touchpoints over time? For example: Is ease of use or pricing a critical service performance dimension for a specific business customer's goal (e.g., a need for a particular solution) that is pursued via a specific channel or through a particular service activity? Under what conditions?
4. How should global firms manage the customer experience across different contexts, cultures and countries? For example, what service attributes are relevant to customers in countries with different levels of trust and uncertainty avoidance?

Service researchers have recently begun to study how customers weigh service attributes depending on their goals, touchpoints and market contexts (e.g., Tarasi et al. 2017). However, more work is necessary to understand systematic regularities in consumer behavior under different conditions.

Some service firms are addressing these challenges by designing service "modules" that help customers achieve different goals. These modules are easily personalized, customized and integrated with customers shopping practices, so they are

experienced as seamless service encounter sequences. In this way, the service firm and customer collaborate in creating valuable experiences and journeys. For example, American Express is a financial services company that has a unique view of both customer and merchant behavior. It has partnered with other service suppliers (e.g., Facebook) to create different services, such as Members Project, Members Know, OPEN Forum, Link/Like/Love and Small Business Saturday. These modules are aligned with specific consumer and merchant goals; they customize the customer journey and deepen relationships.

2.5 Customer Relationship Management at Different Points in Time

Many service firms seek to understand when, why and under what conditions customers will respond favorably and strongly to a firm's relationship-building efforts. Ideally, firms desire customers to embrace customer-company relationships—and become promoters of its services. Service timing creates challenges in creating and managing customer relationships. One reason is that firms often seem to be serving "chameleon customers" who have different needs and preferences at different times and in different contexts. For example, a purchaser of medical supplies for a large hospital might have multiple social identities that are evoked by different situations; he/she may be a doctoral, a business professional, a coworker, a commercial friend and a parent. Each identity evokes different needs, preferences and responses to a service firm's actions (Bolton and Reed 2004).

Firms benefit from supporting customers' social identities—but, to support them, they must know what identities are relevant (or salient) at different points in time—and then design and execute services that affirm and support these identities. Services that are designed and executed in ways that allow multiple identity goals to be pursued synergistically and simultaneously are likely to be highly valued by customers (Fang et al. 2017). For example, Starbucks offers a "third place" where people can enact their workplace identities, as well as enact identities that value environmental sustainability and community, during a single service encounter (See: https://www.starbucks.com/responsibility).

Service firms are interested in identifying or anticipating customer needs and then offering customized solutions. Information from customers' social networks can provide a deeper understanding of customers' attachments and social identities, so that firms can better serve them. For example, Sephora hosts a "Beauty Insider" community for consumers and Teradata hosts a user community for technology users; both communities create value for customers (and for the firm) by sharing information and service/solutions through discussion, blogs, activities, tutorials, and special events. It is noteworthy that these communities excel at leveraging two-way communication and active participation by customers to better serve them in a timely fashion.

Business analytics that leverage social interactions are especially useful in understanding how customers' social identities influence their preferences and behaviors. Research on brand community and customer engagement has shown that customers can become deeply attached to firms and their brands (Brodie et al. 2013; Muniz and O'Guinn 2001), and that these attachments influence their subsequent purchase behavior (Mende and Bolton 2011; Mende et al. 2013). Customers' identification with firms or groups favorably influences their behavior, where organizational identification is defined as a person's perception of oneness with or belongingness to an organization (Mael and Ashforth 1992). Organizational identity has been shown to lead to an increase loyalty behaviors and donations in non-profit settings (Bhattacharya and Sen 2003). In for-profit settings, empirical work has shown that organizational identification increases product utilization, likelihood to recommend the company to friends (Ahearne et al. 2005) and increased willingness to pay (Homburg et al. 2009).

Diagnostic and predictive analytics are useful for innovating and improving services to create, maintain and enhance customer-firm relationships (Verhoef et al. 2003). For example, in B2B contexts, smart machines can report their need for maintenance and repair. Applications are emerging in B2C contexts as well. For example, Apple's Siri can suggest an alternate travel route when traffic is heavy. More research is needed to improve firm's ability to design and execute service that is timely is supporting customer's social needs. Pressing questions include:

1. How can firms develop more timely applications for behavioral targeting to identify customer needs and goals as they emerge within a relationship?
2. What are some ways to coordinate service activities at a single point in time to enable customers to pursue multiple identity goals to simultaneously?
3. How can firms help a customer envision how timely use of a new service delivers relevant benefits and fits into his/her daily life?
4. How should firms insert product/service offerings into the customer's environment (e.g., offers that leverage interactivity in gaming environments) at the right time?

2.6 Integrating Customer Participation into Service Over Time

Customer participation is an integral part of the service delivery process—but it is highly variable and difficult to anticipate. Hence, a key challenge for service firms is to design and execute service so that it takes into account customer participation at different points in time. Due to advances in information technology, service firms have plethora of ways to gather and analyze individual customer data over time—so that they can better understand and predict customer needs and behavior. Data sources include: eye tracking, face-tracking, behavioral profiling data, RFID tags, smart devices, wearables, clickstream data, key word search data, "social listening"

data, geo-spatial data, mobile data, portable social graphs, and retail data (Lamberton and Stephen 2016).

However, service firms face many challenges in delivering on the promise of service personalization and customization in dynamic contexts. In particular, in a data-rich environment, the challenge for managers is how to analyze and use customer information in a timely fashion. Wedel and Kannan (2016, p. 105) classify analytical methods into four categories of increasing complexity: descriptive statistics and metrics, diagnostic statistical models, predictive models (including machine learning and cognitive systems) and prescriptive models (that offer "optimal" solutions). They note that, to cope with the volume and variety of data in an efficient fashion, dimensions of the data are necessarily reduced through aggregation, sampling or selection, and simplification of contextual features.

Customers enter a service encounter with certain resources and capabilities. Both customers and service providers must dynamically adjust their behavior as the service experience evolves (Park et al. 1989). This situation is easily recognized in traditional service settings, such as professional services, where employees deliver service. A successful doctor or accountant or hair stylist or waiter learns to assess a customer's knowledge and relevant skills, and then tailor his/her interactions to match the client's needs. For example, a hair stylist might ask a customer to pick a picture out of a magazine that shows the desired cut.

Unfortunately, despite improvements in personalization and customization—especially the provision of pertinent information—the ability to use technology to deliver relevant service to consumers is still a promise—not a reality. One reason is that data reduction and simplification of contextual features increases efficiency—which makes information actionable in real time—but it comes at a cost. Models are likely to be timely, but much less accurate. The primary reason is that accurate predictive models for individual customers (or even groups of customers) will require context-specific data—which is (by definition) highly granular.

Most customers quickly discover that "live chat" on a website isn't suited for complex service requests and that personal assistants (such as Siri or Alexa) are quickly confounded by unusual requests (that can't be found in its database). However, the challenge for service providers goes far deeper than simply improving technology to better respond to requests.

As service experiences unfold over time, customers provide inputs—such as giving information or performing certain required roles—and these inputs influence the quality of service and the customer's progress towards his/her goals (Bolton and Saxena-Iyer 2009). For example, when searching online for a solution, a customer may provide certain information about his/her requirements. A consumer searching on Amazon might request information about a "red sweater" or a business customer might describe the characteristics of a system error. With feedback from the search engine, the customer might then refine his request until a suitable item of clothing (or a software patch) is found. This process iterates, with the customer assessing progress towards his/her goals and modifying his behavior accordingly. The service provider does the same (see Fig. 2.1).

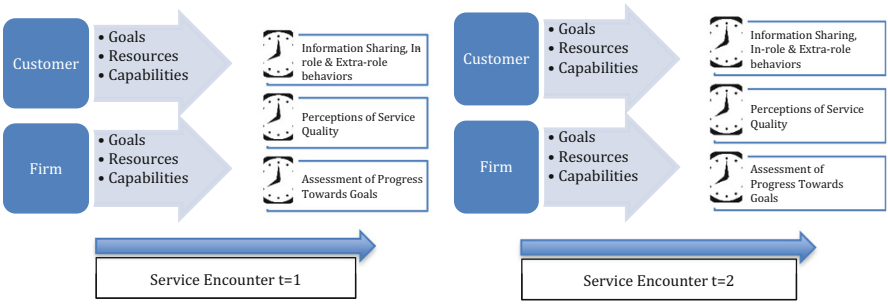

Fig. 2.1 Co-creation in a sequence of service encounters over time

As this scenario demonstrates, if the customer doesn't carry out his/her role effectively or provides inputs that aren't diagnostic, the service is likely to be low quality. The same observation applies to the service provider's role performance and inputs. The service provider must anticipate many possible paths by which the service experience might unfold (Lemon et al. 2002). These issues are magnified a 1000-fold for more complex services that might involve both customer interactions with technology and employees over a lengthy period of time. Complex services, such as health, financial services and complex business solutions, are especially fraught with difficulties.

A variety of issues arise concerning how customer participation (and firm participation) might unfold over time.

1. How do customers' assessment of progress towards goals influence perceived service quality and customer participation during an extended consumption experience? For example, can geo-targeting be utilized to reach the customer at the right time?
2. How do customers' participation behaviors influence their perceptions of service quality and subsequent efforts? For example, are there ways to provide feedback to customers that improves their role performance and perceptions of service quality? Are there ways for customers to provide feedback to firms to improve their performance?
3. How can firms create a seamless service experience that is consistent across a sequence of encounters given the variability in customer behavior? For example, what are effective ways of delivering content relevant to customer needs through mobile service channels despite device and display constraints?
4. How can service firms leverage two-way communications to proactively manage customized experiences for their customers? For example, are active recommendation systems that explicitly obtain inputs from customers more effective than passive recommendation systems that lack context-specific information?

Each question encompasses a mix of short-run and long-run challenges. For example, many service firms are integrating location-based services into their

offerings today. However, in the future, mobile space-time envelopes require significant improvements to better anticipate customer needs, as well as *where and when* service is relevant (Brimicombe and Li 2006).

2.7 Service Timing: Dive Deep into Data

The design and execution of excellent service requires better *timing* of customer-firm interactions because—ultimately—better timing makes service offerings relevant. To achieve better timing, service firms must understand:

- *The Past*: What has been the customer journey to date and what (currently) are the customer's goals?
- *The Present*: What is the customer's current context (touchpoint, servicescape etc.) and his/her resources and capabilities for co-creating service, as well as expectations and risk perceptions
- *The Future*: What are the customer's short-term and long-term goals? How will the customer respond to different scenarios (firm actions and environmental cues)? What might cause him/her to change current behaviors?

Service firms are poised to take advantage of new technologies and data sources to create services that are better timed to meet customer needs. What might improve service timing?

- *Services Triggered by Contextual Cues*: Rather than focusing on (static) customer characteristics, services should be designed and executed based on how customers are responding—and will respond to—to their environment.
- *Service Sequences Customized to Match Customer Goals*. Design customer service experiences that allow customers to pursue their goals using the touchpoints and processes that they prefer: traditional services, (online) interactive services, and intermediary services—and find ways to collaborate to improve their outcomes.
- *Services Designed to Support Customers' Multiple Social Identities*: Services firms should better understand customers' social identities, including their unconscious processes, emotions, habits, and impulses, by integrating data from multiple sources (observational, textual, and unstructured data).
- *Services that Collaborate with Customers during Design and Execution:* Customers will range along a continuum from those who prefer little participation to those who seek to spontaneously co-create. Service firms must be prepared to work with customers who have diverse goals, resources and capabilities.

A common theme among these innovations and improvements to services is the need for iterative learning and adaptation as an individual customer's service experience unfolds.

In today's world, people have welcomed doctors who use robots to guide surgery and cars that can drive themselves. However, these two examples tackle problems

that are well-defined from both customers and suppliers viewpoints. In contrast, anticipating customer needs and collaborating to fulfill them is a more complex feat. In addition, there are many opportunities to innovate and improve services, such as health, education, and financial planning, which are important to society, as well as individual customer's well-being.

2.7.1 Methodological Issues: Deep Data and Business Analytics

Earlier, this chapter argued that service managers and researchers need "deep data"—a fusion of relevant longitudinal data from many sources—to understand and improve customer experiences (Kramer et al. 2004). Service firms need to move towards more complex diagnostic statistical models and predictive models, including machine learning and cognitive systems (Wedel and Kannan 2016). What are characteristics of deep data are appropriate for building more advanced models? Deep data should encompass:

- Observations over time, as well as across customers
- Unstructured, as well as structured data collection (including experiments)
- Measures of sensory, emotional, social, cognitive, behavioral and spiritual experiential attributes
- Information that transcends touchpoints, silos and market boundaries
- Process measures from the quality production process, the quality experience process, and the quality evaluation process
- Multiple actors in networks, where there are simultaneous actions and interactions among by firms, customers and other partners

Excellence in service design and execution requires more than timing—it requires relevance. Service managers and researchers would do well to think carefully about how they exploit data and technology to better serve customers. As Dr. E. O. Wilson (1999, p. 294), the Nobel prize-winning biologist wrote:

> We are drowning in information, while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices wisely.

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