The Object of Service Design

Fernando Secomandi, Dirk Snelders

Introduction

Recent decades have witnessed a steep increase in service research springing from disciplines as diverse as economics, management, and engineering. For the most part, this interest is a response to the expansion of the service sector in the last century and the consequent penetration of services in almost all areas of industrial activity and contemporary life. Services now represent an undeniable force behind labor and value creation in the world economy.

Until recent years, however, design approached services as if they were mere appendages to goods. It is not uncommon to still observe in design discourse the surreptitious inclusion of services in expressions like "product/service" or "product (and service)," without a deeper explanation of the meaning of these compound terms. By implication, the fixation on goods persists, which is understandable considering design's historical role in giving shape to the material culture of modernity. But since the advent of post-industrial societies, the half-hearted integration of services into design discourse is increasingly out of touch with the times. Services must receive the attention they deserve so as to unpack the concept and place it in the center of design thought and action.

Fortunately, there are signs within the design community of a movement to advance service design.[1] One of the issues motivating current research is the idea that service designers create multiple contacts, or *touchpoints*, between service organizations and their clients, including material artifacts, environments, interpersonal encounters, and more.[2] The identification of touchpoints as an object of service design is a clear step away from the imposition of the goods-centered paradigms of the past. However, touchpoints remain poorly conceptualized from a design perspective. At best, their origins in service research are traced back to the notion of *service evidence* introduced in the seminal writings of G. Lynn Shostack in marketing.[3] Unfortunately, as we argue below, such a portrayal of touchpoints places service design on the wrong track, because it turns the design of services into a peripheral activity—namely, that of "accessorizing" an essentially intangible relation between service providers and their clients.

The lack of clarity over the object of service design is aggravated by the superficial treatment in design scholarship of the alternative concepts and theories found in the service literature. In addition to Shostack, researchers from multiple backgrounds

1 Any attempt to provide an accurate portrayal of a rapidly evolving field is bound to suffer from incompleteness. Still, as formative of the field of service design, the following advances originating within the design community should be mentioned. Articles published in academic journals: e.g., Nicola Morelli, "Designing Product/Service Systems: A Methodological Exploration," *Design Issues* 18:3 (Summer 2002): 3–17; Carla Cipolla and Ezio Manzini, "Relational Services," *Knowledge, Technology & Policy* 22:1 (2009): 45–50; Claudio Pinhanez, "Services as Customer-intensive Systems," *Design Issues* 25:2 (Spring 2009): 3–13. Specialized research groups: e.g., SEDES research, led by Prof. Birgit Mager, at the Köln International School of Design (Germany). PhD theses of Pacenti, Sangiorgi, and Cipolla, under guidance of Prof. Ezio Manzini, at the Politecnico di Milano (Italy). Networks bringing together practitioners and academic institutions; e.g., Service Design Network. Service design consultancies; e.g., livelwork and Engine (Great Britain). Dedicated conferences in North America (Emergence 2007, USA), Europe (Service Design Network Conference 2008, The Netherlands), and Asia (International Service Innovation Design Conference 2008, South Korea). Books and chapters in edited books: e.g., Gillian Hollins and Bill Hollins, *Total Design: Managing the Design Process in the Service Sector* (London: Pitman, 1991) and Bill Moggridge, *Designing Interactions* (Cambridge, MA: MIT Press, 2007). And other Internet-based resources: e.g., Jeff Howard's "Design for Service," available from: http://design-forservice.wordpress.com/ (accessed June 19, 2010).

have proposed conceptual handles for thinking about services in the context of their development, commercialization, and use. However, their contributions are rarely recognized as relevant for design and remain scattered across the literature, often obscured by different disciplinary discourses. The purpose of this article is to analyze these various service models in order to locate and ground the object of service design in the broader field of academic research on services.

Alternative Service Models

In this section, we introduce alternative service models discussed in the literature from distinct disciplinary perspectives. Our exposition is based on an extensive survey of academic publications on services and is organized in four subsections, roughly corresponding to the disciplines of service marketing, management, engineering, and economics. The purpose is not to provide an exhaustive overview of all the literature we consulted, but to focus on original contributions that can impart knowledge about our topic of interest and are widely applicable across service sectors. As such, there is a certain bias in our selection toward older publications over recent restatements of comparable ideas. Where appropriate, commentaries about related work are added in side notes. We present each model separately in an attempt to preserve their internal coherence and conceptual integrity. Our descriptions thus remain observant of the authors' intentions and terminologies. However, this approach should not be taken to mean that we fully endorse each of these service conceptions. Rather, the goal is to explain relevant concepts and theories in sufficient depth, and to invite readers to reflect upon a number of received views of services and design. In doing so, we highlight special features of the texts that are pivotal to the argumentation developed in the section that follows, where we interpret the content introduced and explicitly address the question of the object of service design.

Shostack's Evidence

In *Breaking Free from Product Marketing*, Shostack claimed that marketing's disregard for services could be attributed to an inability to deal with their intangible nature.[4] According to her, services are impalpable and non-corporeal and, therefore, "cannot be touched, tried on for size, or displayed on a shelf."[5] The "dynamic, subjective, and ephemeral" nature of intangible elements in services prevents them from being described as precisely as products.[6] The introduction of her molecular modeling approach, illustrated in Figure 1, was intended to provide a framework for dealing with intangibility.

In a molecular model, goods and services may be represented as combinations of discrete tangible or intangible elements, with their identity being determined by the relative dominance of each

2 Cf. Birgit Mager's entry on *service design* in Michael Erlhoff and Tim Marshall, eds., *Design Dictionary: Perspectives on Design Terminology* (Basel: Birkhäuser, 2008).

3 G. Lynn Shostack, "Breaking Free from Product Marketing," *Journal of Marketing* 41:2 (1977): 73–80.

4 Ibid.

5 Ibid., 75.

6 Ibid.

7 In the complete molecular model, Shostack later included three outer layers representing strategic marketing decisions in terms of *distribution, price and cost*, and *advertising and promotion*. See G. Lynn Shostack, "How to Design a Service," *European Journal of Marketing* 16:1 (1982): 49–63. Along similar lines, Booms and Bitner sought to expand the traditional *4P* marketing framework (product, place, promotion, and price), by incorporating three novel elements (people, process, and physical environment) into an upgraded *7P* marketing mix for services. See Bernard H. Booms and Mary J. Bitner, "Marketing Strategies and Organization Structures for Service Firms," in *Marketing of Services*, ed. James H. Donnelly and William R. George (Chicago: American Marketing Association, 1981), 47–51. Also consider Lovelock and Wright's addition of an eighth "p" representing service *productivity and quality*). See Christopher Lovelock and Lauren Wright, *Principles of Service Marketing and Management* (Upper Saddle River, NJ: Prentice Hall, 1999).

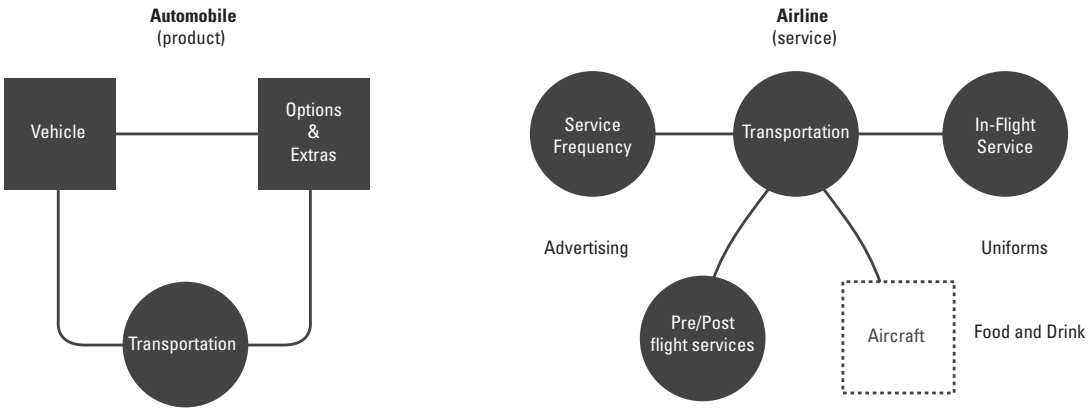


Figure 1 (above)
Molecular models describing cars (left) and airlines (right). Circles represent *intangible elements*; squares represent *tangible elements*; dotted squares represent *essential evidence*; and *peripheral evidence* is scattered around the other elements.

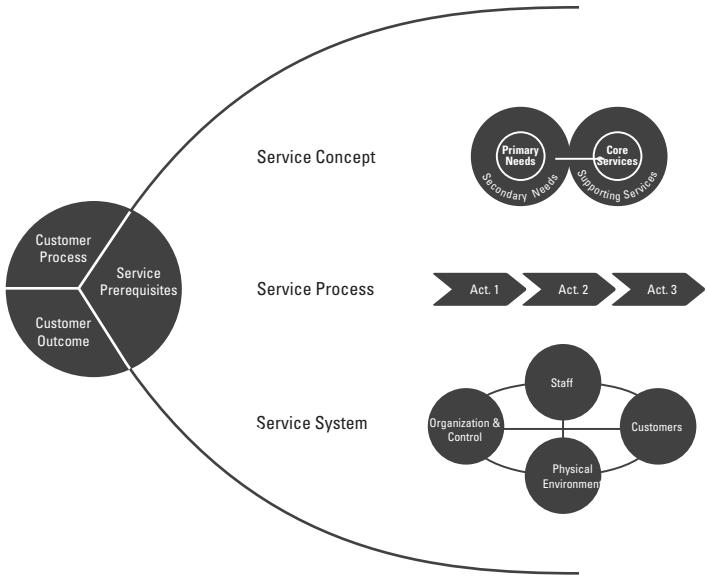
type of element.[7] Shostack argued that most goods and services lie along a continuum from tangible-dominant to intangible-dominant. In Figure 1, for instance, cars would be deemed products because they are mainly physical objects with tangible options and extras; even so, they also have a service dimension, as they incorporate the intangible element of transportation, which may be marketed independently. On the other hand, airlines can be identified as service providers because of the preponderance of intangible elements.

Although intangible elements are the defining features of services for marketers, Shostack also realized they do not represent their total "reality" for consumers. She argued that because of the abstractness of services, consumers cannot experience them directly, but only through their peripheral tangible clues, or *evidence*. She therefore defined service evidence as comprising everything "the consumer can comprehend with his five senses."[8] In the airlines example in Figure 1, this evidence includes the aircraft, advertising, tickets, food and drinks, and other such items. Moreover, staff often stands as the main evidence of services because the way they dress and speak, their hairstyles, demeanor, etc., "can have a material impact on the consumer's perception."[9] Because service evidence is so important, Shostack believed that it "must be [as] carefully designed and managed as the service itself."[10]

Shostack distinguished between two types of service evidence: peripheral and essential.[11] *Peripheral* evidence refers to the tangible elements consumers can possess but that have little independent value, such as tickets for airline services. In contrast, *essential* evidence, such as an aircraft, has an important role in the evaluation of the services purchased but cannot be owned by consumers. Although essential evidence was paramount in Shostack's conception of services, she considered such evidence to represent "quasi-product elements"[12] that could not have the status of true tangible elements because, as such, they would have been evidence of goods rather than services.

8 Shostack, "Breaking Free from Product Marketing," 77.
9 Shostack, "How to Design a Service," 53.
10 Ibid., 52.
11 Ibid., 51–2.
12 Ibid., 52.

Figure 2
Frame of reference for new service development with service prerequisites detailed.



Service evidence came to play an important role in Shostack's development of "service blueprinting," a flowchart technique to aid in systematic service design.[13] In service blueprints, items of tangible evidence usually become departure points for examining "hidden" production activities that are internal to companies and beyond direct customer contact, or in Shostack's words, below their "line of visibility."[14] Shostack's work on service blueprinting, not presented in detail here, ran alongside the growing focus of her thoughts on the notion of *process*, which she eventually saw as the service equivalent of a product's "raw materials."[15] Nonetheless, even as her views on the role of service design centered more and more on blueprinting processes, Shostack maintained that companies should always "incorporate the orchestration of tangible evidence."[16, 17]

Edvardsson and Olsson's Prerequisites

Edvardsson and Olsson's service conception is an amalgam of views commonly circulating in the broad area of service management studies.[18] These authors were concerned that the quality shortcomings faced by many companies were "built into" their services at an earlier design phase. In response, they sought to develop a frame of reference for new service development that would help companies to improve service quality by design.

According to Edvardsson and Olsson, the service construct comprises three elements, as seen in the left side of Figure 2. In the first place, there is the *service outcome*, or what customers perceive and value as the result of service production. Service outcomes can be tangible or intangible, temporary or lasting. A haircut would be a tangible, temporary outcome for customers, whereas an insurance policy would represent an intangible and lasting outcome. Service outcomes are formed by customer processes on the one hand and

13 The service blueprint initially was presented in Shostack, "How to Design a Service," and later again in G. Lynn Shostack, "Designing Services That Deliver," *Harvard Business Review* 62:1 (1984): 133–9.

14 Ibid., 138.

15 G. Lynn Shostack, "Service Positioning through Structural Change," *Journal of Marketing* 51:1 (1987): 34.

16 Shostack, "Designing Services That Deliver," 136.

17 Several scholars later adopted service evidence in their own service models. Worth briefly mentioning are Berry and Parasuraman's identification of *physical environment*, *communications*, and *price* as crucial kinds of evidence, and Bitner's similar reference to *people*, *process*, and *physical evidence*. See Leonard L. Berry and A. Parasuraman, *Marketing Services: Competing through Quality* (New York: The Free Press, 1991) and Mary Jo Bitner, "Managing the Evidence of Service," in *The Service Quality Handbook*, ed. Eberhard E. Scheuing and William F. Christopher (New York: AMACOM, 1993), 358–70. More recently, the terms "clues," used by Pullman and Gross, and "touchpoints," by Zomerdijk and Voss, were intended to convey Shostack's notion of evidence from an experience design perspective. See Madeleine E. Pullman and Michael A. Gross, "Ability of Experience Design Elements to Elicit Emotions and Loyalty Behaviors," *Decision Sciences* 35:3 (Summer 2004): 551–78 and Leonieke G. Zomerdijk and Christopher A. Voss, "Service Design for Experience-Centric Services," *Journal of Service Research* 13:1 (February 2010): 67–82.

18 Bo Edvardsson and Jan Olsson, "Key Concepts for New Service Development," *The Service Industries Journal* 16:2 (April 1996): 140–64.

service prerequisites on the other. *Customer processes* refers to the active participation of customers in production processes, which Edvardsson and Olsson saw as a distinctive characteristic of services as opposed to goods.[19] Customer processes do not exist in a vacuum but depend on the *service prerequisites*, which are the resources needed to make the service possible. By engaging in production processes, customers use service prerequisites and co-produce outcomes for themselves. Edvardsson and Olsson thus argued for understanding services from a customer perspective: "It is the customer's total perception of the outcome which 'is the service' … what the customer does not perceive does not exist—is not a customer outcome."[20]

If outcomes can represent the whole service for customers, Edvardsson and Olsson held that prerequisites are closely associated with the company perspective: "the service company does not provide the service but the prerequisites for various services."[21] They organized new service development activities around the three prerequisite components: service concept, service process, and service system (see Figure 2, right side).[22] The *service concept*[23] is a brief description of the service package[24] (core and supporting services) that answers different customer needs (primary and secondary). It is the departure point for specifying all other prerequisites. The *service process* represents the chain of activities necessary for service production. Edvardsson and Olsson explained that the service process is a prototype for the activation of *customer* processes upon each unique customer encounter. Finally, the *service system* comprises the resources the service process requires to realize the service concept: company staff, customers, physical/technical environment, and organization and control.[25]

It is at the level of service system resources that Edvardsson and Olsson address service development activities in more detail. They considered *company staff* to be a key resource because many services depend on the tangible encounter between the staff and customers. Companies should aim to have motivated, knowledgeable, and committed staff, partly by devising attractive jobs and hiring and training the staff properly. Second, *customers* themselves could take part as prerequisites of the service system by contributing their own knowledge, equipment, and capacity to assimilate information. According to Edvardsson and Olsson, the service system should be designed to facilitate the engagement of customers in co-producing the outcome. Marketing could also help to establish relations between companies and their customers, for instance, through the design of invoices and information materials. The third resource, the *physical/technical environment*, pointed to the organization of the facilities, equipment, and other technical systems located on the service company's own premises or those of its suppliers and customers. Finally, *organization and control* involved several activities: putting in place administrative systems to support

19 Other researchers have also regarded higher levels of customer involvement in production processes to be the most important variable in characterizing service operations and in setting strategic directions for the design of service systems. See R.B. Chase, "Where Does the Customer Fit in a Service Operation?" *Harvard Business Review* 56:6 (1978): 137–42; Urban Wemmerlöv, "A Taxonomy for Service Processes and its Implications for System Design," *International Journal of Service Industry Management* 1: 3 (1990): 20–40; Scott E. Sampson and Craig M. Froehle, "Foundations and Implications of a Proposed Unified Services Theory," *Production and Operations Management* 15:2 (Summer 2006): 329–43; and Pinhanez, "Services as Customer-intensive Systems."

20 Edvardsson and Olsson, "Key Concepts for New Service Development," 145.

21 Ibid., 147.

22 Elsewhere, Edvardsson named the service process and system components the *servuction* process and system, respectively. See Bo Edvardsson, "The Role of Service Design in Achieving Quality," in *The Service Quality Handbook*, ed. Eberhard E. Scheuing and William F. Christopher (New York: AMACOM, 1995), 331–46. Servuction is a neologism combining the words "service" and "production" to denote the simultaneity of production and consumption in services. In line with the original servuction system, customers interact with the "visible" part of a service organization, which consists of the *physical environment*, *contact personnel*, *other customers*, and *customers in person*. See E. Langeard et al., *Services Marketing: New Insights from Consumers and Managers*, vol. 81 (Cambridge, MA: Marketing Science Institute, 1981).

23 The service concept is a term commonly encountered in the literature. Clark et al. presented an elaboration of the service concept in terms of *value*, *form and function*, *experience*, and *outcomes*. See Graham Clark, Robert Johnston, and Michael Shulver, "Exploiting the Service Concept for Service Design and Development," in *New Service Development: Creating Memorable Experiences*, ed. James A. Fitzsimmons and Mona J. Fitzsimmons (Thousand Oaks: Sage Publications, Inc, 1999), 71–91. See also Susan Meyer Goldstein et al., "The Service Concept: The Missing Link in Service Design Research?" *Journal of Operations Management* 20:2 (April 2002): 121–34.

Figure 3
Breakdown of an entire restaurant service process.

Restaurant Services

Processes	Inputs		Outputs
Ordering	Customer Recieves Menu		Meal is Delivered
	Customer Service Activities / *Service Operation Activites*		
	Order is Delivered to Kitchen	Order is Prepared in Kitchen	Order is Collected from Kitchen
Dining	Meal is Delivered		Customer Requests Bill
Billing	Customer Requests Bill		Payment is Collected
Leaving	Payment is Collected		Customer Departs

planning, information exchange, finance, and resource allocation. Furthermore, the company's interaction with customers and other partners needed to be controlled by planning such aspects as how to gather feedback and how to handle complaints. In addition, the company should also consider its organizational structure, with proper definition of roles, responsibilities, and authority.

Ramaswamy's Processes

Ramaswamy turned to the key notion of process, making it the centerpiece of a comprehensive framework for the design and management of services.[26] His framework is so methodical and formalized that it can be seen as a forerunner to several service engineering approaches.[27] From his elaborate work, we highlight the stages where service processes are conceptualized and detailed for implementation because these phases are particularly relevant for design.

For Ramaswamy, services are fundamentally "nonphysical" entities.[28] A service process is a sequence of activities that provide functions, chronologically organized as a unity. A process may be further divided into smaller sub-processes and sub-subprocesses, and is organized hierarchically, so that a higher level process is completely assembled from its component sub-processes. Service processes comprise two sorts of activities: *service operations activities*, which reflect the steps needed by service providers to transform inputs into outputs, and *customer service activities*, representing the interactions between customers and service providers. An ideal service process begins with input from customers and ends with "visible" output for them.[29]

24 The service package, sometimes called *bundle*, or *offering*, is a multifaceted concept. Lovelock proposed a basic separation between *core* and *supplementary services*, to which Lovelock and Wirtz later added *delivery processes*. See Christopher H. Lovelock, "A Basic Toolkit for Service Managers," in *Managing Services: Marketing, Operations, and Human Resources*, ed. Christopher H. Lovelock, 2nd ed. (Englewood Cliffs, NJ: Prentice-Hall International, 1992), 17–30, and Christopher Lovelock and Jochen Wirtz, *Services Marketing: People, Technology, Strategy*, 6th ed. (Upper Saddle River, NJ: Pearson/ Prentice Hall, 2006), 22–5. Grönroos departed from this conception of a basic package and described an *augmented service offering*. See Christian Grönroos, *Service Management and Marketing: Managing the Moments of Truth in Service Competition* (Lexington, MA: Lexington Books, 1990). In a second line of thought, Sasser et al. and Fitzsimmons and Sullivan defined the package as comprising *physical items and facilities*, *sensual benefits (or explicit services)* , and *psychological benefits* (*or implicit services)* . See W. Earl Sasser, R. Paul Olsen, and D. Daryl Wyckoff, *Management of Service Operations: Text, Cases, and Readings* (Boston: Allyn and Bacon, 1978) and James A. Fitzsimmons and R. S. Sullivan, *Service Operations Management* (New York, NY: McGraw-Hill, 1982). Normann further synthesized these latter insights with the previous separation between core and supplementary services. See Richard Normann, *Service Management: Strategy and Leadership in Service Business*, 3rd ed. (Chichester, NY: Wiley, 2001). The service package was also considered in other hybrid conceptualizations, such as Lehtinen's *service consumption process* and Grönroos's *service production system*. See J. R. Lehtinen, *Quality Oriented Services Marketing* (Tampere, FI: Tampereen Yliopisto, 1986) and Grönroos, *Service Management and Marketing: Managing the Moments of Truth in Service Competition.*

Figure 4
Breakdown of the ordering process of a restaurant service.

Restaurant Services

Subprocesses	Design Dimensions and Alternatives	Engineering Requirements
Menu reading and ordering	**Screen Display Format** 1 item/page with detailed description All items on 1 page with description on help screen appetizers, desserts, entrees, and beverages on separate pages with brief descriptions.	# of menu pages # menu items menu display interval page refreshment interval etc.
Availability Verification	**Verification Procedure** for each item upon ordering for all items after ordering	Accessing time Inquiry time
Order Validation and Correction	**Verification Procedure** Waiter sends order to kitchen upon receipt;corrections are sent later, after validation Waiter holds order until complete validation;corrections before sending order to kitchen	Transmission time Maximum time for validation

Figure 3 presents a sample breakdown of a restaurant service process, beginning with the arrival of the guests and ending when they leave the establishment. Note how the ordering process (second row) consists of customer service activities, represented by customers' receipt of the menu and later their meals, as well as service operations activities related to meal preparation in the kitchen.

Ramaswamy claimed that the functions of a new service process should be approached as problems guiding the design of solutions. In his systematic framework, solutions for new processes evolve from broad concepts, associated with larger processes, to detailed components related to progressively smaller sub-processes. Figure 4 illustrates three sub-processes of the ordering process: menu reading and ordering, availability verification, and order validation and correction. According to Ramaswamy, solutions for the sub-processes may be devised by altering key *design dimensions*, or the "characteristics that can be manipulated to influence the performance of the design."[30] In his example of a computer-assisted ordering process, these dimensions included the screen display format, menu display, verification procedure, and validation method (middle column).

Specifying design dimensions in different ways results in various *solution alternatives*, as enumerated below each design

25 *Service culture* was later added by Edvardsson et al. as a fifth component of the service system. See Bo Edvardsson et al., *New Service Development and Innovation in the New Economy* (Lund, Sweden: Studentlitteratur, 2000). Another version of the service system briefly contemplated some external influencing factors. See Bo Edvardsson, "Quality in New Service Development: Key Concepts and a Frame of Reference," *International Journal of Production Economics* 52:1 (October 1997): 31–46.

26 Rohit Ramaswamy, *Design and Management of Service Processes: Keeping Customers for Life* (Reading, MA: Addison-Wesley, 1996).

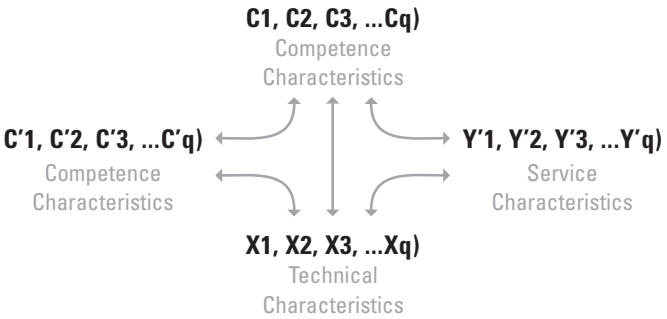
27 Although notable differences hold true, other researchers also took process, or *activity*, as the main building block of their service models, often drawing on knowledge from such areas as mechanical engineering, systems engineering, and computer science, and progressing toward more consistent notation, mathematical formalization, and computational modeling. See, for example, Qinhai Ma, Mitchell M. Tseng, and Benjamin Yen, "A Generic Model and Design Representation Technique of Service Products," *Technovation* 22:1 (January 2002): 15–39; T. Arai and Y. Shimomura, "Proposal of Service CAD System: A Tool for Service Engineering," *CIRP Annals—Manufacturing Technology* 53:1 (2004): 397–400; Robin G. Qiu, "Computational Thinking of Service Systems: Dynamics and Adaptiveness Modeling," *Service Science* 1:1 (Spring 2009): 42–55.

28 Ramaswamy, *Design and Management of Service Processes: Keeping Customers for Life*, 13.

29 Ibid., 128.

30 Ibid., 173.

Figure 5
Characteristics model of services.



dimension in Figure 4. However, for Ramaswamy the configuration of a new service process should be finalized only after iterative cycles of evaluation and refinement of solution alternatives. As a result of the final, most detailed design step, one optimal process solution is specified in terms of the *engineering elements* (right column) needed to create the process, including "the response requirements of hardware, the look of a menu or screen, the contents of a script to be followed by an employee, or the dimensions and weights of parts."[31] This information, according to Ramaswamy, "is used by the implementation team members who are responsible for constructing the service."[32] In other words, engineering elements guide the actual deployment of the new service process—"so far… a set of decisions on paper"[33]—into a working service.[34]

Gallouj and Weinstein's Characteristics

This final sub-section covers a service model from the field of economics—more precisely, the work of Gallouj and Weinstein.[35] Noting how extant research overly privileged the manufacturing of goods, these authors sought to develop foundations for the analysis of innovation activity in the service sector. Their approach begins with the idea that a service seldom exists autonomously. The authors see in this departure point an important difference from a good, which upon production typically assumes a physical independence from its producers and consumers: "[A service] is intangible and does not have the same exteriority [of a good]… it is identical in substance with those who produce it and with those who consume it."[36] For them, this condition underlies many of the peculiarities commonly associated with the production of services, such as the necessary cooperation between providers and clients, the difficulty in standardizing something dynamic and multifaceted, and the confusion between *product* ("what" is delivered) and *process* ("how" it is delivered). Gallouj and Weinstein's formal representation of services in terms of *characteristic sets* is shown in Figure 5.

Gallouj and Weinstein's characteristics model consists of four interacting sets. Set [Y], on the right, represents the *service* characteristics. These are characteristics of services as seen from the user's point of view—in other words, the utilities provided by services to clients. Examples include the user-friendliness and the deposit and withdrawal functionalities of an automated teller machine. Set [X]

31 Ibid., 251.

32 Ibid.

33 Ibid., 258.

34 Kaner and Karni also conceptualized services as hierarchical systems ultimately defined by the values given to their lowest-layer components. Their *capstone model* is a comprehensive, five-tiered service representation, consisting of 9 *major classes* (including process), 75 *main classes*, 351 *minor classes*, and potentially thousands of *attributes* and *values*. See Maya Kaner and Reuven Karni, "Design of Service Systems Using a Knowledge-Based Approach," *Knowledge and Process Management* 14:4 (2007): 260–74.

35 Faïz Gallouj and Olivier Weinstein, "Innovation in Services," *Research Policy* 26 (1997): 537–56.

36 Ibid., 540.

represents the *technical* characteristics that supply service characteristics, which can be divided into *tangible* technical characteristics (e.g., information technologies, logistic technologies, chemical products in cleaning services, etc.) and *intangible* technical characteristics (e.g., financial models, business execution methods, etc.). According to Gallouj and Weinstein, technical characteristics can also be divided into *product* and *process* characteristics by referring to the interface between providers and clients. Thus, *product* technical characteristics would refer to "front-office" production activities in close proximity to customers, while *process* technical characteristics would be the "back-office" activities that don't entail direct customer contact. Although the authors believed in the validity of this distinction, in the end they assumed that both product (front-office) and process (back-office) technical characteristics could be tangible or intangible, and could all be bundled in the same set [X].[37]

Gallouj and Weinstein further added *competence* characteristics as a way to separate technical characteristics from human capabilities. Set [C], according to the authors, represents provider knowledge and skills embodied in individuals (or clearly delimited teams), which are not easily dissociable from the people themselves and therefore cannot exist autonomously or become part of organizational knowledge. To highlight co-production by clients as a major feature of services, Gallouj and Weinstein added *client competence* characteristics (set [C']) to represent knowledge embodied in clients.

The complete model provides an integrative rationale for service production: Service (Y) characteristics are obtained by the direct application of competence characteristics of providers (C) and/or clients (C'), in combination with mobilized technical (X) characteristics {[C], [C'], [X], [Y]}. The model also takes account of a particular class of "pure" services, such as consulting or massage therapy services. In such cases, providers and clients co-produce service characteristics without the involvement of any technical means {[C], [C'], [Y]}.[38] However, Gallouj later observed that the use of even unsophisticated technologies (e.g., a towel for the massage therapist) could represent an intervention of technical characteristics.[39]

Based on the characteristics model, Gallouj and Weinstein operationalized service innovation as "any change affecting one or more terms of one or more vectors of characteristics (of whatever kind—technical, service, or competence)."[40] The authors further noted that innovative changes might "emerge" as a result of "natural learning mechanisms," but they might also be "programmed," or "intentional, the product of R&D, design, and innovation activity."[41] Unfortunately, they did not explain how intentional innovation could be attained specifically through the manipulation of characteristics sets.[42]

37 Gallouj also briefly considered the inclusion into the same set of *spatial* and *geographical organization* characteristics (e.g., restaurant décor, proximity of service establishment, etc.). See Faiz Gallouj, *Innovation in the Service Economy: The New Wealth of Nations* (Cheltenham: Edward Elgar Publishing, 2002), 53.

38 Based on the model, the authors were also able to describe self-service situations, where service characteristics are created through the client's engagement with technical characteristics alone, without the participation of the provider competence characteristics {[C'], [X], [Y]}. In another publication, Gallouj also identified "pure goods" situations, where there is no involvement of competences embodied in humans {[X], [Y]}. See Ibid., 59.

39 Ibid., 56.

40 Gallouj and Weinstein, "Innovation in Services," 547.

41 Ibid.

Locating the Object of Service Design

Having introduced representative service models in the extant literature, in this section we articulate a conceptual framework for locating the object of service design. Whereas previously we described each model individually, now we adopt an interpretive stance that engages with that same material. Our conclusion builds up progressively in the following subsections.

Exchange Relations

One of the most fundamental aspects of service production is the intertwining of stakeholders—most notably, providers and clients—in exchange relations. As Gallouj and Weinstein noted, services are not easily set apart from providers and clients as an independent entity; they seem to exist to a substantial degree within this context of economic exchange. Edvardsson and Olsson, as well as Ramaswamy, also point out the necessary involvement of customers in service co-production. Even when left implicit, as in the case of Shostack, exchange relations are presumed based on the recurrent references to both marketers and consumers.

Exchange relations establish the context for attributing particular roles to the stakeholders involved in service co-production. Typically, providers devise and market services; clients purchase and use them. Furthermore, an investigation of the circumstances of exchange relations reveals a host of sociotechnical resources that are required for service production. For Gallouj and Weinstein, service innovation could be linked to changes in terms of human competences, plus tangible and intangible technical characteristics. Other authors who were more prescriptive about service innovation developed ideas about the planning and organization of these resources. Following Edvardsson and Olsson's framework for new service development, companies should develop the right prerequisites, which can then be processed by customers, leading to high-quality outcomes for them. Similarly, for Ramaswamy, service providers should engineer new production processes, whereas customers should provide inputs and evaluate the outputs of such processes. Finally, Shostack advises marketers to carefully manage all the tangible evidence that can affect the consumer's experience of a service. In principle, then, design in services can be related to the coordination of a varied set of sociotechnical resources, leading to innovative forms of exchange between providers and clients.

Interface Versus Infrastructure

An analytical distinction introduced by many researchers is to separate service production activities into two domains: the *interface*, which focuses on the sociotechnical resources immediately associated with exchanges between providers and clients, and the *infrastructure*, which accounts for resources less directly related to that exchange. One criterion for distinguishing these domains

42 In recent years, other authors have elaborated on the characteristics approach to service innovation. De Vries noted how Gallouj & Weinstein's model falls short when representing innovation in a network of organizations, where clients co-produce a service by using their own technologies. He reformulated both the technical and competence characteristics sets to account for multiple organizations, and added the novel *client technical* characteristics set. See Erik J. de Vries, "Innovation in Services in Networks of Organizations and in the Distribution of Services," *Research Policy* 35:7 (September 2006): 1037–51. Windrum and García-Goñi, writing in the context of health care, also pointed to the need for representing innovation in a multi-agent environment, and included policy-makers as new stakeholders alongside providers and users. They further diminished the importance of technical characteristics, proposing instead that innovation in knowledge-intensive services is better captured as the negotiation over *competence* and (newly-added) *preference* characteristics, which are possessed by all agents. See Paul Windrum and Manuel García-Goñi, "A Neo-Schumpeterian Model of Health Services Innovation," *Research Policy* 37:4 (May 2008): 649–72.

suggested in the literature is their dislocation in time and space. This is apparent in Ramaswamy's restaurant example, where meals are first ordered from and later served by waiters (the interface comprises the customer service activities), while between ordering and serving, the meals are prepared in the kitchen, out of the sight of the customer (the infrastructure comprises the service operation activities). A slightly different criterion was proposed by Shostack, who introduced the concept of the line of visibility. This line separates what is tangibly evident to the bodily senses of consumers (interface) from what is hidden from them in the form of intangible elements or processes (infrastructure). In addition, Gallouj and Weinstein allude to a possible distinction between "what" results for clients from product characteristics in the front office (interface) and "how" this results from process characteristics in the back office (infrastructure).

The interface and the infrastructure are inextricable counterparts of the sociotechnical resources involved in exchange relations, and both can be considered a concern for service design. In Edvardsson and Olsson's account, the company should plan the interactions between customers, staff, and physical environments for the exact moment of service co-production. But they should also consider other necessary prerequisites, including those that must be in place months before service provision begins (e.g., administrative systems for the allocation of financial resources).

A characteristic of the interface that merits attention, but that has not been sufficiently stressed in the literature, is the particular way in which the interface *actualizes* the co-production of the service, as it conveys the infrastructure and brings to fruition the exchange relation between providers and clients. Continuing the previous example, for Edvardsson and Olsson the development of prerequisites extends to infrastructure resources, but the goal is to influence customers' perception of the services. And this perception is created at the interface, when the customers process the prerequisites into outcomes. Also, for Ramaswamy the design of new service processes includes the infrastructure, yet results in a working service for providers only after implementation, when inputs and outputs are actually exchanged with customers in service activities at the interface. The relevance of the interface is acknowledged by Shostack when she observes that service reality, at least for consumers, could only be known through the tangible evidence. In sum, exchange relations between providers and clients require the mobilization of infrastructure resources but, ultimately, are realized through the interface. For this reason, the interface becomes subtly prominent as the end-point of all service design deliberations.

Materiality

In this subsection, we conclude our investigation by highlighting the materiality of the service interface. Despite the emphasis on

intangibility encountered throughout the service literature, many researchers have commented on certain tangible aspects of the service interface as well. For example, Shostack deems services inherently abstract and founded on processes. But she observes that they could only be experienced by consumers through what marketers make tangible to them. Ramaswamy, too, places as building blocks in his framework nonphysical processes, but he later elaborates on them in terms of concrete engineering elements, such as screen displays and other hardware in his restaurant service. Gallouj and Weinstein also include tangible technical characteristics in their characteristics sets. And for Edvardsson and Olsson, the physical/technical environment constitutes an important element of the service prerequisites processed by customers.

That the service interface includes material artifacts and systems can hardly be disputed. At the same time, one of the strongest convictions of researchers has been that services are something more than—or, indeed, anything but—a simple physical "thing." Can it be concluded that the service interface, in essence or for the most part, is immaterial?

A closer look at the literature shows several types of sociotechnical resources in services that differ from the material artifacts identified. For example, in their prerequisite list, Edvardsson and Olsson include organization and control resources related to organizational structure, administrative systems, and marketing management. These resources are similar to Gallouj and Weinstein's intangible technical characteristics, which include financial expertise, mathematical instruments, economic models, and so forth. Under scrutiny, such resources seem to be located within the infrastructure domain of the service provider. Therefore, as stated, these resources need to be actualized through the service interface to affect exchange relations with clients. Hence, Gallouj and Weinstein's proposal that services may be delivered by intangible technical characteristics located at the front office appears to be unsubstantiated. The reason is that, at the moment clients would encounter intangible technical characteristics (e.g., in the form of mathematical instruments in consultancy services), they would experience them through tangible manifestations (e.g., slide projections, or words and graphs in a printed report). The point, of course, is not to downplay the importance of intangible technical characteristics, nor to reduce them entirely to their tangible depictions. Instead, we suggest that, for the production of services, intangible resources must be actualized through an interface that is material and available to bodily perception.

A problem area for the idea of a material interface is the consideration of humans as sociotechnical resources, especially where providers and clients meet face to face. As Gallouj and Weinstein observe, in the production of "pure" services, providers and clients interact directly via skills and knowledge that might

not be easily dissociated from them. One usual way of thinking about the organization of interpersonal encounters in services is to conceptualize human resources as abstract and inherent to individuals. For Edvardsson and Olsson, for example, company staff members contribute to service production through their knowledge, motivation, and commitment, which providers could develop through proper recruitment and training, among other indirect ways of influencing behavior. Another way of dealing with person-to-person interaction has been to pinpoint human resources of a more concrete but extrinsic nature. For example, Shostack observes that some manageable service evidences could be found in the way contact employees dress, what they say, and their hairstyles. Comparably, Ramaswamy includes in the engineering requirements of new service processes the scripts that direct the behaviors of people.

Interpersonal service encounters cannot be removed from human subjectivity and spontaneity. However, this reality does not preclude personal interactions in services from being shaped, in the absence of other material means, by the embodied behaviors of providers and clients (e.g., gestures, uttered words). What is implied here is neither a simple "objectification" of human participation in service production, nor an argument for manipulating such participation in the same way one would deal with other material artifacts. Instead, our contention is that service exchange relations between providers and clients are grounded on the materiality of their interfaces, even in the case of interpersonal encounters.

For design, the crux of the matter might lie not in acknowledging the materiality of the service interface, but in understanding its distinctive nature. From our literature review, it appears that every time empirical cases are used to exemplify what goods and services are, researchers readily associate goods with a physical thing, yet they fail to apply an equally concrete standard to services. As a result, services are deemed intangible (or elusive, dynamic, multifaceted, etc.), not because they are unavailable to embodied experience, but because what their interface conveys is *predominantly not a standalone artifact with clear object boundaries*. Instead, service interfaces seem primarily related to embodied human interactions, such as in Gallouj and Weinstein's massage therapy service; diffuse phenomena appealing to the senses, such as the tastes, smells, and sounds in Ramaswamy's restaurant service; multiple tangible elements organized over time and space, as in Shostack's airlines; and possibly more. The distinctive characteristic that stands out in these cases is not intangibility, but the material *heterogeneity* of the service interface.

Our view sits close to Shostack's concept of tangible evidence. However, Shostack believed that the true nature of services was founded on intangible elements and abstract processes. Although evidence was important for her, it represented in her view only a

surrogate "reality" for consumers. Because Shostack reserves the possibility of a genuine material existence for tangible elements, which she associates with goods, she describes service evidence with the derogatory term "quasi-products." Service evidence thus came to be inauthentic, peripheral clues of an intangible core. The implication of this view, accentuated later when Shostack adopted processes as the foundation of services, is that the design of evidence could now represent just an ancillary activity, one that creates "accessories" for immaterial services. We go beyond this view and claim that the service interface *materializes* an exchange relation between providers and clients, and that the design of the service interface, perhaps more than anything else, is the design of the service *itself*.

A Pathway for Service Design

Shostack wrote three decades ago,[43] and her work continues to inspire researchers who seek to break free from goods-oriented paradigms by stating that services are essentially intangible. Today, this idea gains credence in the way that touchpoints are identified as a central object of service design. The danger resides in defining a touchpoint as a tangible interface between providers and clients that is peripheral to an intangible service core. In stark contrast, we claim that the client-provider interface is crucial to service design because, ultimately, it brings new services into being. Moreover, by highlighting the material heterogeneity of such an interface, we present a way for letting services *be* on their own, neither equating them with the kind of artifacts associated with goods, nor abstracting them into processes, nor resorting to their socioeconomic circumstances of co-production for a final explanation. Therefore, our initiative to find a suitable object for service design, as much as it is an effort to catch up with other disciplines, is also an attempt to further our general understanding of services in ways that favor a "designerly" approach to the matter.

We observe a clear tendency in the literature to develop more elaborate analyses about the design of the service infrastructures than of the interfaces. The rare discussions on service interface design seem to arise as tangential, after-the-fact implications of planning the infrastructure. This neglect of the interface coincides with the embedding of design discussions primarily in service management and engineering discourses, but also with the timid participation in service research of design disciplines traditionally devoted to phenomena in the interface domain of services (e.g., product design, interaction design, graphic design, and many others). Closer attention to the interface would therefore appear to be a natural way for these disciplines to take up new grounds in service research and promote a deeper appreciation of design in services.

43 Shostack, "Breaking Free from Product Marketing."

Acknowledgments
The authors sincerely thank Gui Bonsiepe, Petra Badke-Schaub, Pieter Desmet, and Vera Blazevic for providing comments on an earlier version of this article.