

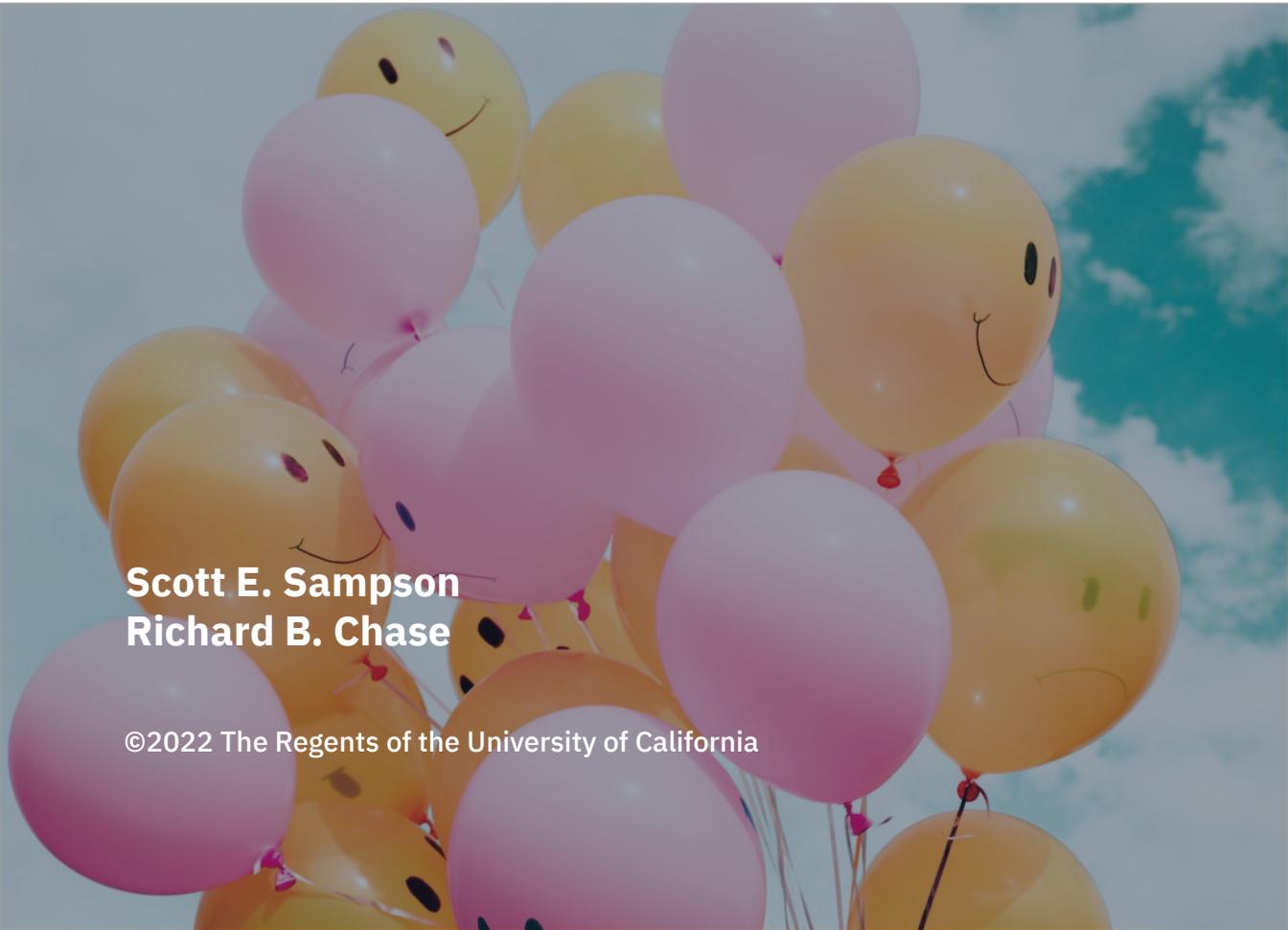
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Optimizing Customer Involvement: How Close Should You Be to Your Customers?

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SUMMARY

Two strategic factors of any business are customer interaction (how close you are to your customers) and customer participation (how involved customers are in producing the offering). In recent years, we have seen companies increase interaction through servitization and increase customer participation through self-service technologies. Yet, more is not necessarily better. Too much customer interaction can destroy operating efficiencies. Too much customer participation can compromise quality and depersonalize service relationships. This article provides a framework for analyzing customer interaction and participation, including an outline of decision factors, with the goal of identifying optimal and sustainable positioning for any given offering.

KEYWORDS: service strategy, service system design, service system design tools, service system improvement, servitization

More than four decades ago, Chase introduced a “customer contact approach” to service that recognized the prominence of customer interaction as a defining characteristic of service operations.¹ In the ensuing years, the concept of customer interaction has evolved tremendously, largely due to advances in customer-facing technologies.² Companies face perplexing decisions about where and how much customer interaction is appropriate. Too much interaction destroys operating efficiencies.³ Not enough interaction depersonalizes relationships and can frustrate customers. The strategic choice of how much to interact with customers is a managerial dilemma.

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Parallel to the customer interaction evolution (or devolution) has been a research renaissance about customer participation in the formation of value propositions. Instead of viewing customers as passive consumers of firms' value-laden products, the more enlightened perspective esteems customers as key players in value creation.⁴ Early thought leaders in this renaissance were Normann and Ramirez, who declared, "The goal [of business] is not to create value for customers but to mobilize customers to create their own value from the company's various offerings."⁵

The customer participation renaissance comes with its own dilemma. Customers can realize greater value as they are empowered in their value-creation responsibilities. This empowerment includes customers becoming more knowledgeable consumers who have access to an almost unlimited variety of resources. Coupled with lower transaction friction and reduced switching costs, customers have new power that enables them to abandon relationships with providers the moment the next best thing comes along. To stay competitive, firms need to empower customers in their value creation, but that empowerment can undermine interdependence.⁶

The COVID-19 pandemic brought the issues of customer interaction and customer participation even more to the forefront. The pandemic forced reduction in nonessential interpersonal interactions, leading to dramatic adjustments in service delivery. Restaurants and retailers shifted to providing online ordering coupled with curbside or at-home delivery—keeping interpersonal interaction to a bare minimum. In some ways, consumers became more involved in producing their own resources or in providing resources to other customers.⁷ For example, home meal kits allow customers to produce meals on their own using provided ingredients, and after years of languishing, they are now growing in popularity.⁸

Well before the pandemic, companies and even entire industries were searching for more sustainable levels of customer interaction and customer participation. An example of this attempted realignment is the trend known as *servitization*, in which manufacturers shift to a service focus,⁹ implying increased interaction with customers.¹⁰ Although the term *servitization* was first coined in 1988, Schmenner points out that the concept originated in the 1850s.¹¹ He explains, "Servitization extends the reach of the manufacturer ever closer to the customer and the customer's underlying needs." Along this line, we view servitization as primarily involving firms taking on increased customer interaction while redefining the customer and provider roles in value creation.

In this article, we provide the means to analyze strategic adjustments to customer interaction and customer participation. Strategic issues include the following:

How can managers identify an optimal level of interaction for company offerings (i.e., how close should we be to our customers)?

How do changes in interaction relate to changes in customer participation (recognizing that these are two different strategic levers)?

What combinations of customer interaction and participation are most likely to be sustainable going forward?

The Servitization Paradox

Over the past few decades, many companies have seen their long-standing and formerly profitable business models slip out from under them. For example, manufacturers hit hard by commoditization and global competition have attempted servitization in order to shore up revenues and profits,¹² but with mixed results.¹³ In a study involving 10,028 firms, Neely found that servitization leads to higher revenues but lower profit margins, on average.¹⁴ The literature describes this as a “servitization paradox” wherein manufacturers shift to providing related services and thus experience increases in revenues but paradoxically do not experience corresponding increases in profits.¹⁵

For example, Pearson Higher Education has long been among the largest textbook publishers in the world. Under competitive pressures, Pearson made a servitization shift from producing physical textbooks to providing digital services with the goal “to have a direct relationship with millions of lifelong learners.”¹⁶ Pearson’s digital services division—Global Online Learning—highlights the paradox, having had the highest revenue growth but the lowest profit margin of the company’s divisions.¹⁷

IBM is another example of a firm that experienced the servitization paradox. Throughout the twentieth century, IBM focused on designing, producing, and selling products such as computer hardware and software. Over time, hardware and software faced the severe price compression of commoditization, which sometimes left the company in serious financial trouble. In response, IBM shifted to a service focus by taking on data processing functions of client companies and moving into labor-intensive consulting services. These servitization moves increased revenues but at much lower profit margins than IBM was accustomed to—again, the servitization paradox.¹⁸

Getting closer to customers through servitization can be precarious. While servitization results in increased customer interaction, it is not at all clear that more interaction is better. Interaction breeds inefficiency. Variation in customer needs and capabilities limits the ability to standardize offerings and thus reduces the so-called “experience curve” effects that bring production costs down. In addition, W. Edwards Deming so aptly stated, “Uncontrolled variation is the enemy of quality”—including variation that comes from increased customer interaction.¹⁹

Pressure to Deservitize

Even more prevalent than servitization is an ongoing trend for service firms to *reduce* the closeness of interaction with customers, which is known as *deservitization*.²⁰ Deservitization is usually not about eliminating service offerings, but rather reducing the amount of customer-provider interaction involved

in the offerings. This deservitization has been largely enabled by technologies, especially self-service technologies that allow customers to meet their own needs with reduced reliance on human interaction. Customer-facing technologies have replaced frontline workers in various service industries. Examples include the following:

The vast majority of bank transactions take place without interpersonal interaction through online banking and especially mobile banking.²¹

The employment of travel agents has been decimated by the broad use of travel-booking websites and smartphone apps.²²

Many high-touch retailers with knowledgeable customer-service employees are going bankrupt²³ while online retailers flourish.²⁴ Many of the surviving brick-and-mortar retailers are trying to reduce interpersonal interaction via self-checkout stations.

Large healthcare organizations are pushing the use of self-service patient portals to help patients take more control of their healthcare with less need for in-person visits.²⁵

U.S. citizens are increasingly using software and online tools for filing income taxes, resulting in a decrease in demand for human tax-preparation experts.²⁶

These examples and countless others demonstrate that deservitization through self-service technology has the simultaneous effects of reducing customer interaction with company employees while increasing the amount of customer participation. Customers are drawn to these self-service options because of increased convenience, lower prices, and increased control.²⁷ This deservitization also dehumanizes customer relationships with providers, supplants “full service” options, and dissolves previous advantages of being “local” or in close proximity to customers. The role of frontline employees, once deemed as key to building customer loyalty,²⁸ is now marginalized.

Thus, we see that deservitization can also lead to weakened customer relationships. Despite mounting pressures to servitize or to deservitize, both options can seem perilous. How do we make sense of these seemingly contradictory strategies?

Developing a Customer Involvement Framework

Prior research on customer involvement has considered factors pertaining to interaction and customer participation in the creation of value. The framework we describe in this article is unique in that it considers the interplay between interaction and participation as it relates to servitization/deservitization.

The goal is to identify sustainable strategies for positioning companies' offerings along a *production spectrum*. In the literature, the word *production* is characterized as making (i.e., producing) and providing resources ("outputs" or "products" or even "services") that have the potential to benefit customers.²⁹ While production is the work of factories, we take the broader view in which production pertains to the work of all businesses: hotels produce rested guests, orthodontists produce straightened teeth, consultants produce advice, and retailers produce purchase transactions, universities produce more intelligent citizens, legislators produce laws, and so forth.

The first dimension of our framework is customer interaction. By *customer interaction*, we are referring to interaction between a customer and a provider, which has been recognized as a defining element of all service.³⁰ Customer interaction has been described in the literature as *customer contact*. The initial descriptions of customer contact focused on in-person interaction.³¹ Subsequent authors refined customer contact in terms of the nature³² and the degree of contact.³³

Sampson describes two primary types of interaction.³⁴ The first is *direct interaction*, which is person-to-person interaction, either in person or mediated by technology (e.g., a phone call). He calls the second type *surrogate interaction*, in which a customer, or some other entity, interacts with a resource of another entity, such as a technology. Online banking is an example of surrogate interaction. Direct interaction is always synchronous, yet surrogate interaction is usually asynchronous, meaning that it happens at a time when only one of the parties is personally engaged in the process. For this reason, phone or chat communications tend to be direct interaction, but email messages are classified as surrogate interaction. Like Chase, Sampson identifies interaction as limiting potential operating efficiency, more so with direct interaction than surrogate interaction.³⁵

The second dimension of our framework is customer participation. *Customer participation* is defined in the literature as "the degree to which a customer contributes effort, preference, knowledge, or other inputs to service production and delivery."³⁶ Customer participation has been described as *customer input*.³⁷ The phrase has also been erroneously equated with *co-production*,³⁸ which is defined as "customer participation *within organization-defined parameters*" [italics added].³⁹ Thus, co-production is the special case of customer participation occurring under the purview of the provider, and thus is more closely equated with interaction. For example, Ikea sells furniture kits that customers assemble in their homes; the assembly process involves significant customer participation but little to no interaction with Ikea, thus not being co-production.

Again, customer participation varies by type and degree. At one extreme, the customer can have no participation in production but relegate all production activity to a supplier.⁴⁰ At the other extreme, the customer can have total participation, which has been called *internal exchange*, implying that customers serve their needs using their own resources.⁴¹ In between these extremes are degrees of

shared participation in production. For example, Zeithaml et al. present a “customer participation continuum” with five degrees between the two extremes.⁴²

Distinctness of Concepts

The concepts of customer participation and customer interaction have been discussed separately in the literature but seldom jointly.⁴³ On occasion, they are treated as two manifestations of the same concept,⁴⁴ but it is clear that they are distinct. The theory behind the distinction was provided by Meuter and Bitner, who describe three categories of production⁴⁵: *firm production*, in which the provider is completely responsible for production and the customer does not participate; *joint production*, in which the firm’s employees work with customers in production of the service; and *customer production*, in which the customer is completely responsible for production with high levels of involvement and no direct interaction with the firm. Note that this sequence of categories is increasing in customer participation; firm production has the least customer participation and customer production involves the most, even though those two represent decoupled production with minimal interaction. The intermediary—joint production—is where interaction primarily occurs. Thus, customer participation and customer interaction are distinct (but related) concepts.

This idea of customer-provider interaction being flanked by independent action of providers on one side and independent action of customers on the other side has been presented by other researchers. Grönroos describes three spheres of production—a provider sphere, a joint sphere, and a customer sphere—in which interaction occurs in the joint sphere.⁴⁶ Moeller describes integrative decisions of companies and their customers sandwiched between the autonomous decisions of each.⁴⁷ Sampson describes a provider’s process domain and a customer’s process domain, with interaction occurring at the intersection of the two.⁴⁸ Dong et al. describe three levels of customer participation in service production: low (provider led), moderate (customer-provider collaborative), and high (customer led).⁴⁹

These three types of production represent increasing amounts of customer participation but increasing—then decreasing—amounts of interaction.

A Production Continuum

To form a framework, we augment the three-level production continuums from prior literature with two intermediate components of surrogate interaction (interaction with an inanimate resource).⁵⁰ Our framework includes five types of production that we will describe with pizza production examples:

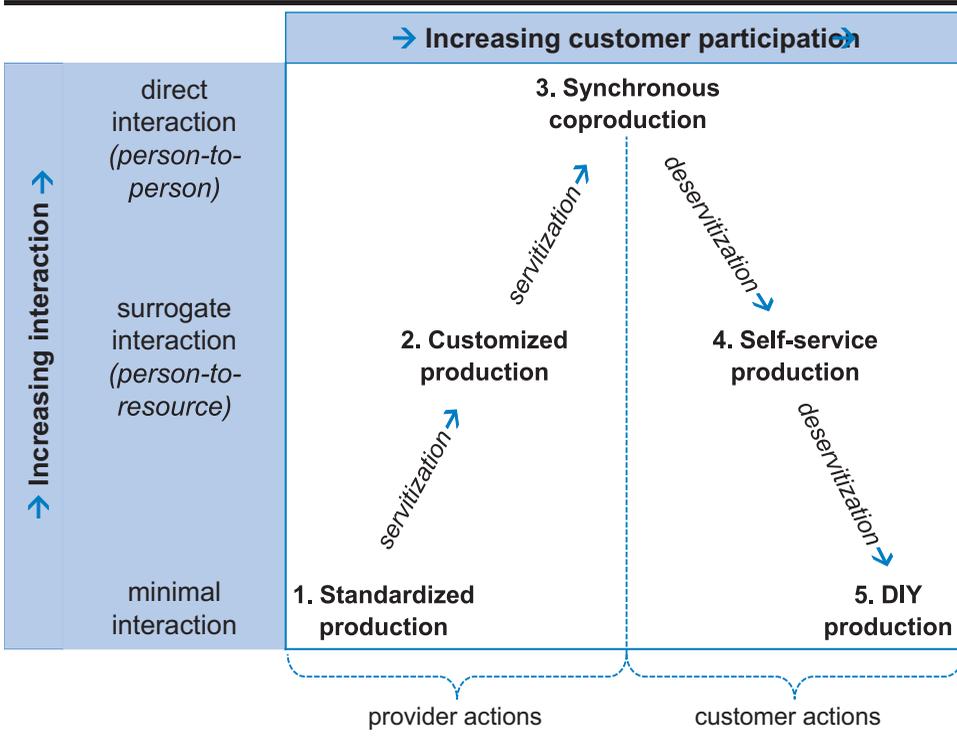
1. *Standardized production* (firm production) involves providers making standardized products for future sale to customers, as in traditional make-to-stock manufacturing. Production is decoupled from customers who are down

the distribution supply chain. A pizza example of standardized production is a factory producing prepackaged frozen pizzas for distribution through grocery stores.

2. *Customized production* involves a provider acting upon customer-provided inputs. This is provider-instigated surrogate interaction, in other words, providers acting on customer-supplied resources such as preferences or belongings. Servitization literature calls this *product-oriented services* since the focus is on supporting customers' products.⁵¹ A pizza example of customized production is a restaurant kitchen that produces pizzas based on customer orders.
3. *Synchronous co-production* involves providers working cooperatively with customers to find solutions to customer needs. The term *co-production* recognizes that the customer and the provider are both involved in producing the offering. *Synchronous* implies that it is joint action during the given stage of production. Servitization literature calls this *customer-oriented services* since it focuses on supporting customers' needs.⁵² Pizza restaurant chains employ synchronous co-production when customers discuss options with employees at the time of assembling the pizzas (like Subway® does with sandwiches).
4. *Self-service production* involves customers meeting their own needs by utilizing the providers' platforms and resources, as seen in the deservitization examples described above. This is customer-instigated surrogate interaction, in other words, a customer acting on provider resources. Pizza vending machines provide an example of self-service production, as customers push buttons to select toppings and the pizza is then produced by automation.
5. *DIY production* is do-it-yourself production, meaning that the customers meet their own needs using their own resources, perhaps including some resources that they previously acquired from various providers. This is maximum customer participation, and the customer has unshared control of the process. A pizza example of DIY production is customers making their own pizzas at home using equipment and ingredients they previously acquired.

A primary difference between self-service production and DIY production is ownership. With self-service production, the customer is utilizing resources that are owned and maintained by the provider. With DIY production, the customer takes ownership and thus has complete control of the production resources.

Again, note that customer participation increases in the sequence from standardized production to DIY production,⁵³ but customer interaction increases then decreases. Moving from standardized production toward synchronous co-production involves an increase in customer interaction, which we have defined as servitization. Moving from synchronous co-production toward DIY production involves a decrease in the degree of customer interaction with the provider, which is deservitization. These interrelationships are depicted in Figure 1.

FIGURE 1. Customer involvement framework.

Note: DIY = do-it-yourself.

The horizontal axis of Figure 1 represents increasing customer participation, with provider actions on the left and customer actions on the right. Recall that synchronous co-production is joint production, meaning that it involves both provider and customer actions together. As such, synchronous production is the only type that involves direct interpersonal interaction (high on the vertical axis). Table 1 summarizes how customer and provider roles vary across the five types of production.

Note that there is not a set sequencing between servitization and deservitization. Any firm that increases customer interaction is undergoing servitization regardless of the starting point. Similarly, any firm that decreases customer interacting is undergoing deservitization. Not shown in Figure 1 is shifting from synchronous co-production to customized production or standardized production, which would be deservitization. Likewise, shifting from DIY to self-service production to synchronous co-production would be servitization. Nevertheless, the shifts depicted in Figure 1 are the most common forms of servitization and deservitization.

These five types of production are ubiquitous and occur in different ways within any given firm. For example, we can consider IBM's offering portfolio. Up until recently, IBM had five major divisions:

TABLE I. Five Types of Production Processes.

Type	Customer Role	Provider Role
1. Standardized production	None or general segment feedback (e.g., market research feedback)	Manages all aspects of production based on perceived customer segment needs
2. Customized production	Supplies key inputs to the provider's production process	Receives customer requirements and adjusts production accordingly
3. Synchronous co-production	Interacts with the provider in shared production	Interacts with customers in shared production
4. Self-service production	Gives effort in using the provider's resources	Provides customers with an easy-to-use production platform
5. Do-it-yourself production	Assumes total control over production	Provides customers with knowledge and resources

- IBM's Systems division mass produces "IBM Z" mainframe computers in factories, which is largely standardized production;
- IBM's Global Technology Services division works on client problems, which is customized production;
- IBM's Global Business Services division consults with clients in synchronous co-production;
- IBM's Cloud & Cognitive Software division allows customers to run applications on cloud platforms such as IBM Watson AI supercomputers, which is self-service production; and
- IBM's Global Financing division provides capital to clients for client projects in what can be characterized as DIY production (IBM also provides Red Hat software which customers can use in DIY production under a software subscription model).

Our research over the past decade shows that these five types of production processes exist in most businesses. Examples from various industries are shown in Table 2. We cannot overemphasize that these are types of production processes, not types of companies. While a given company may have many production processes of a given type, all companies will have processes of multiple types, and even a particular product may involve multiple production process types.

As an example, one of the authors regularly asks students, "Which of the five types is Disney?" The most common answer is "synchronous co-production," referring to customer interactions with employees at Disney Parks; "self-service production" could also apply as customers interact with the park itself. The author responds by saying, "No, I mean Disney animation," to which the students say, "Oh, standardized production." Disney Parks also has standardized production of

TABLE 2. Production Type Examples.

Type	Developing a Fitness Program	Analyzing Investment Options
1. Standardized production	Provider develops prerecorded fitness programs that can be sold to customers.	Provider analyzes investments for a mutual fund.
2. Customized production	Provider develops customized fitness programs based on information customers enter on a web form.	Provider centrally analyzes individual clients' investment portfolios.
3. Synchronous co-production	Jointly develop a fitness program through interactive discussion between producer and customer.	Provider and client discuss financial needs and jointly analyze investment options.
4. Self-service production	Customer develops own fitness program using provider's tools.	Investor analyzes own investments using provider's online tools.
5. DIY production	Customer acquires knowledge to develop their own fitness plans.	Investor analyzes own investments by creating a spreadsheet model.
Type	Selecting Music	Planning Medical Treatment
1. Standardized production	Provider selects a standard mix of music (e.g., radio).	Researcher develops a standard treatment for an illness.
2. Customized production	Provider selects a mix of music based on customer preferences (e.g., Pandora).	Physician develops a treatment plan based on patient's MRI images or other data.
3. Synchronous co-production	Provider and customer discuss music alternatives (e.g., DJ).	Physician negotiates treatment options with the patient.
4. Self-service production	Customer selects music using provider tools (e.g., Spotify).	Patient gets treatment advice from a diagnostic tool.
5. DIY production	Customer selects music from owned library (e.g., purchased MP3s).	Patient determines a treatment plan on his or her own.

Note: DIY = do-it-yourself; MRI = magnetic resonance imaging.

churros, customized production of hat monograms, synchronous co-production at the entrance gate security station, self-service production at the ticket kiosks, and DIY production of guest arrival planning. Indeed, different parts of any given process can and likely will involve different types of production processes (For a more in-depth look at this concept, see the article "Visualizing Service Operations"⁵⁴ or the book *Essentials of Service Design and Innovation*⁵⁵).

Sometimes it is desirable or necessary to provide multiple options to address a given customer need, which is an *omnichannel* service delivery strategy. Disney Parks' guests can plan a vacation using Disney's online planning tools (self-service production), or they can call a Disney travel specialist to discuss options (synchronous co-production), or they can email preferences to a trusted travel agent who will

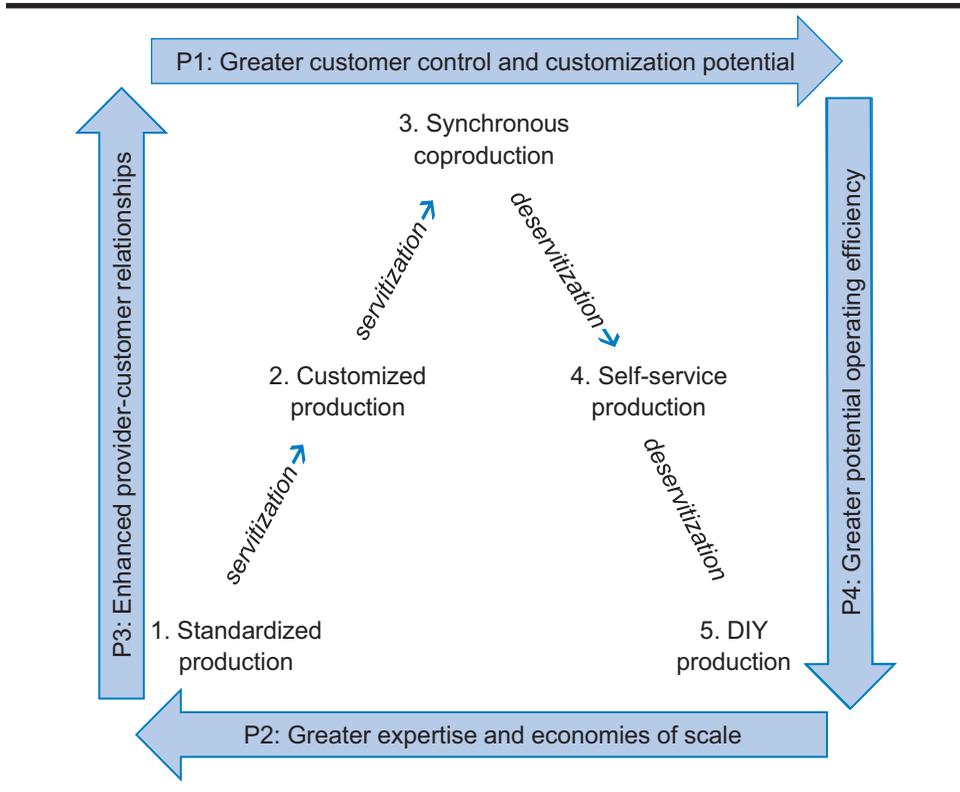
develop a vacation plan (customized production), or they can select from a prepackaged vacation plan (standardized production), or they can just make all the plans themselves (DIY production). The strategic question is where Disney wants to be and where it needs to be in the future to support vacation planning and other offerings. This leads us to consider the trade-offs between the production positioning alternatives.

Positioning Principles

There are strategic advantages in having certain types of production, and there are corresponding disadvantages in having other types. The following are four principles about the desirability or undesirability of each production type. These principles are graphically represented in Figure 2.

Principle P1 (top of Figure 2): *Greater customer participation corresponds to greater customer control and customization potential.* Customization can be thought of as conforming to individual customer requirements, which means allowing customers to influence production.⁵⁶ It has long been recognized that customization is facilitated by customer participation.⁵⁷ Servitization has been defined as “the

FIGURE 2. Characteristic principles of production types.



Note: DIY = do-it-yourself.

process by which a company expands from selling products and basic services to delivering customized solutions.”⁵⁸ Indeed, customization has been found to be a major motivator for servitization.⁵⁹ Increased interaction means that customers have increased ability to influence the production process. However, when customers take over a degree of responsibility for production, they have even greater control over how it is performed and thus an even greater ability to influence how, when, and where the production takes place.⁶⁰ According to Wolf and McQuitty, one of the primary factors influencing customer selection of DIY options is having a need for greater customization than providers can offer.⁶¹

Returning to the pizza example, a prepackaged pizza produced at a factory is standardized. A pizza produced in a restaurant kitchen (customized production) might involve customer requests (“extra cheese”). Customers assert even greater influence on the pizza production if the pizza is produced in interactive collaboration with a restaurant employee. If the customers take over the labor function through self-service, they assert even more influence over the pizza production process. The customers have the greatest control over the process if they produce the pizza in their own kitchen where they can do things that restaurants might not be willing to do, such as using unusual or exotic ingredients.

Principle P2 (bottom of Figure 2): *Greater customer participation corresponds to reduced expertise and other economies of scale.* When production involves fixed costs, such as acquiring specialized equipment or specialized skills, utilization of those resources leads to economies of scale: as the utilization increases, the allocation of a portion of fixed cost to individual units of production decreases.⁶² Specialized providers have the advantage of using their equipment to meet the needs of many customers, with the high utilization resulting in tremendous economies of scale.⁶³ Customers who meet only their own needs have lower utilization of resources, thus limiting economies of scale. When fixed costs are great, this can be prohibitive.

One of the most prevalent fixed costs is the acquisition of expertise. The literature cites expertise as a limitation of increased customer participation.⁶⁴ Quality of outcome can suffer if customers are expected to participate in the production process but do not have the necessary skills to do so.⁶⁵ Expertise—knowledge and skills—has been cited as a key resource in all businesses.⁶⁶ Specialized providers leverage their expertise across many customers. Self-serving and DIY customers can incur a great cost in acquiring expertise but only utilize that expertise to meet their own needs.

Pizza production involves fixed costs, including acquiring expertise and pizza ovens. A single factory can produce prepackaged pizzas for a large geographical region and thus attain high utilization of equipment and corresponding high economies of scale. Production equipment in a restaurant can produce pizzas for many customers at that location yet with lower utilization than at a factory. At the other extreme, customers may procure their own pizza-making equipment, typically with low utilization because they only use the equipment to meet their own needs and perhaps the pizza needs of family and friends.

Principle P3 (left of Figure 2): *Greater interaction enables enhanced provider-customer relationships.* The process of servitization replaces episodic transactional relationships with continuous co-productive relationships.⁶⁷ The breadth of relationships increases as additional service offerings are added.⁶⁸ In an empirical study of servitization, Kastalli and Van Looy assert that increased interpersonal interaction, which they refer to as *customer proximity*, leads to greater knowledge about customers and greater opportunities to strengthen customer relationships.⁶⁹ Admittedly, deservitization can also involve gaining knowledge about customers, such as through websites. However, research indicates that replacing human interactions with technology interactions can adversely affect rapport⁷⁰ and other aspects of customer relationships.⁷¹

Pizza factories have decoupled relationships with individual consumers, being buffered by the distribution supply chain. Similarly, consumers who create their own pizzas at home have decoupled relationships with the suppliers of ingredients. In both of these extremities of the production spectrum, the consumers may have preferences for specific suppliers and brands but little relationship with the provider. Interactive co-production involves personalities and service relationships that can help tie the customer to the provider's organization.

Principle P4 (right of Figure 2): *Greater customer interaction corresponds to reduced potential for operating efficiency.* This was the central premise of Chase's customer contact model for service.⁷² Customer interaction introduces variation into the production process, thus increasing the cost of providing service.⁷³ Note that there are two ways to decrease interaction and improve operating efficiency: turn production over to the provider or turn production over to the customer. Option 1 is what Normann calls a *relieving innovation* since it relieves customers of the task.⁷⁴ Standardization has been recognized as the best way to increase efficiency.⁷⁵ The task specialization of providers allows them to move down the experience curve and thus produce at a lower cost.⁷⁶ Option 2 is what Normann calls an *enabling innovation*, meaning customers are enabled to meet their own needs with minimal or no interaction with providers.⁷⁷ A primary motivation providers have for enabling customers with self-serve technologies is cost savings, which is the essence of efficiency.⁷⁸ Similarly, cost savings is a major customer motivation for undertaking DIY activities. Those savings can be significant vis-à-vis the cost of co-producing with service providers.⁷⁹

Again, in our pizza example, the prepackaged pizza factory has specialized equipment, finely tuned production processes, and well-trained labor. At this writing, a typical frozen pizza sells for around \$5, illustrating the efficiency of their production. The Little Caesars pizza chain similarly sells large, pre-cooked pepperoni pizzas for about \$5. Conversely, a large custom pizza at a full-service pizza restaurant sells for \$10-\$20 or more, depending on the labor intensity of the process. Customers can save money by producing their own pizzas, assuming they have the expertise and equipment. Ultimately, the best way to make a low-cost pizza is either standardized production or DIY production.

Considering the Trade-Offs

Determining the optimal production positioning requires considering the trade-offs among the alternatives. Standardized production and DIY production are what we have identified as decoupled operations, which entails either providers producing independently from customers or customers producing independently from providers. The result is tremendous operating efficiency (principle P4). Standardized production also has the advantage of great economies of scale (P2). A disadvantage of decoupled operations is low interaction between customers and providers, resulting in loosely coupled relationships (P3). Synchronous co-production is the most interactive of the alternatives and has the lowest operating efficiency (P4).

DIY production has the worst economies of scale since individual customers meet only their own needs. However, a great advantage of DIY production is that customers have maximum control over how the production process unfolds (P1). In DIY production, the customers can perform the process when, where, and how they want, assuming they have the knowledge and skills to perform it all. With standardized production, customers have no control over the production process but can only select from the produced items. Synchronous co-production is positioned between standardized production and DIY production, meaning it provides some trade-off of advantages and disadvantages of those two alternatives. Still, the problem of chronic inefficiency (P4) can make synchronous co-production unsustainable in the long run.

Note that the benefits and costs of the different production alternatives are shared between providers and customers, which is a system perspective. Customization (P1) benefits customers by conforming to their needs and benefits providers by justifying higher prices. Both customers and providers benefit from economies of scale (P2) and enhanced relationships (P3). Providers that experience greater operating efficiency (P4) can pass savings on to customers.

Case Study: Walmart+

For an example of managing the trade-offs, consider Walmart's recent foray into home delivery. Walmart's original operating strategy could be broadly summarized in two elements: procure and stock items as efficiently as possible; and provide an expansive retail store where customers could select from a wide variety of items. This was highly successful because Walmart leveraged tremendous economies of scale in the procurement process (standardized production, principle P2), resulting in lower costs; and customers could fill many product needs by visiting only one store—a Walmart Supercenter.

Then, something happened. Jeff Bezos had the idea that going to only one store was one store too many. Amazon had the economies of scale of Walmart, but without the physical store. Members of Amazon Prime would receive free 2-day home delivery of a wide variety of items. In response, Walmart shifted to online ordering and free home delivery in what they call Walmart+. Our framework can

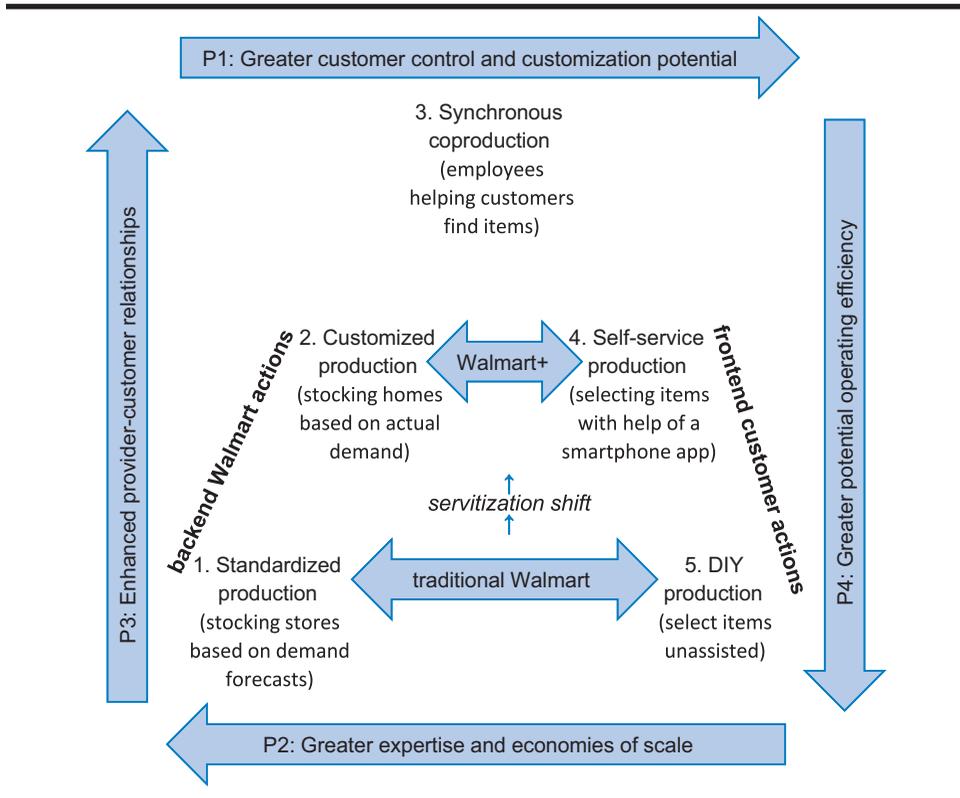
help us visualize this servitization shift, as depicted in Figure 3. There are at least five options for stocking and selecting items that customers need:

1. Retailers could select items for customers in a standardized way;
2. Retailers could select items based on customer requests (i.e., customized);
3. Customers could interact with retail employees to select items they want (i.e., synchronous);
4. Customers could select items using the retailer’s resources (self-service); and
5. customers could select items unassisted (DIY).

The original Walmart employed standardized production on the backend, with stores procuring and stocking items based on forecasts of customer demand, and DIY production on the frontend, with customers selecting items largely unassisted, as depicted in Figure 3.

On the backend, Walmart+ shifts to customized production with home delivery. This servitization shift increases customization (principle P1) since each

FIGURE 3. Walmart’s servitization.



Note: DIY = do-it-yourself.

customer's home becomes a stocking point, decreases economies of scale (P2) since the stocking of homes is in small batches, compared with the stocking of stores in large batches, enhances the relationship between Walmart and customers (P3) through coordination of delivery, and decreases operating efficiency (P4) with stocking homes being much more labor intensive than stocking stores. Is this going to work? Success will depend on Walmart's ability to manage the balance between customer benefits (P1 and P3) and the operational disadvantages (P2 and P4). Amazon is attempting to compensate for the backend inefficiency through heavy investments in automation and through entrepreneurial crowdsourcing, which Walmart may or may not be able to match.

On the frontend side of customers selecting items, Walmart+ improves economies of scale (principle P2) since one employee can shop for multiple customers, but reduces customer control and customization potential (P1) since customers need to turn over granular decisions to Walmart employees. For example, some customers might be happy with any bananas or tomatoes, while others may want bananas or tomatoes of a specific variety, size, and ripeness. Similarly, some customers are content with ordering shoes on a smartphone app, but others might want to try on different styles and sizes first. Customers who want maximum customization and control of the item selection process may choose to visit the store and DIY select items themselves. However, if Walmart+ winds up being highly popular, it may cannibalize in-store sales suggesting the DIY picking may drop in popularity and the stores become less-than-efficient warehouses.

Amazon has few brick-and-mortar stores to accommodate picky customers who prefer DIY picking but has established other mechanisms to give customers a sense of control in selecting items they cannot physically assess. Amazon collects extensive reviews of customer products, solicits customer answers to questions posed by other customers, and allows free returns for many items.

Note that neither Amazon nor Walmart are actively pursuing the synchronous co-production method of retail used by "high-touch" retailers such as Nordstrom, Macy's, Kohl's, and JCPenney, which have attempted to deservitize through online offerings with varying success. It is quite apparent that synchronous co-production is a very costly way to manage the retail experience.

Avoiding the Extremes

The examples of Walmart and other traditional retailers reveal some competitive disadvantages of being at the positioning extremes of standardized production, synchronous co-production, and DIY production. Metaphorically, think of the Figure 2 framework diagram as a boxing ring. For readers unfamiliar with boxing, the sport takes place in a square "ring" bounded by elastic ropes. The boxers dance their way around the ring in an attempt to land a blow that will result in a knock-out. Boxing provides a powerful analogy for the dances of deservitization and deservitization that companies go through in response to competitive pressures. Specifically, boxers are at a severe disadvantage if their opponent gets them "on the ropes," meaning at the perimeter of the ring (literally leaning

against the ropes), since there they have limited maneuverability. Walmart was such an example, and Amazon had them on the ropes.

Standardized production is “on the ropes” in an area with decoupled relationships (P3) that are subject to commoditization. In that corner of the ring, firms often need to compete either on having huge economies of scale (P2) implying being a major producer, or on cost (P4) implying having low-cost labor or automation. China has emerged as an economic superpower largely by mastering the skill and focus of standardized production. Walmart’s economy of scale was trumped by Amazon’s tremendous ability to source items from low-cost providers in China and elsewhere.

DIY production is also on the ropes in an area where customers do not regularly interact with providers, which can be great for customers wanting maximum control (P1) at low cost (P4) but detrimental for provider-customer relationships (P3). Competing in DIY is often difficult because customer relationships are decoupled, and customers have maximum control in selecting or abandoning providers. Home Depot does a great job promoting DIY production, including offering free training to help customers develop expertise in home improvement. However, that training will equally enable customers to purchase resources from competitors like Lowes.

Synchronous co-production is not stuck in the corner but is also on the ropes at the point of unsustainable inefficiency and high-cost structures. Eventually, producers discover how to decouple the customer interactions and make them more efficient either through customized production and/or self-service technologies. This is happening at a significant pace, as illustrated by the deservitization examples described previously (banking, travel planning, and retail). For example, Nordstrom has survived and prospered by closing most of its full-service stores and opening hundreds of self-service Nordstrom Rack stores.

As such, firms are increasingly finding that a better positioning is “off the ropes”—away from the extremes—in the areas of customized production and self-service production. Those alternatives allow for useful trade-offs between the factors described in Figure 2. The optimization goal is to achieve appropriate balance among the competing principles.

Achieving Balance and Compromise

The challenge under customized production is allowing customization (P1) while still attaining reasonable economies of scale (P2). The *experience curve* effect mentioned earlier suggests that repeated production leads to reduced costs, but that only works insofar as production is consistent. Changes in production, such as those caused by excessive customization, can limit experience curve benefits.⁸⁰ Firms participating in customized production may need to constrain customization to practical dimensions, for instance by giving customers a menu of customization options to choose from. Fast food chains are doing this by providing customized offerings that customers configure using a phone app or a restaurant kiosk.

Another approach for effectively accommodating customization is to reduce the time and cost of having to adjust for each customer's production needs, which in manufacturing terms we call *setup-time reduction*. With the fast-food example, providers can pre-configure common components such as ingredient portions that can be quickly added as requested by customers. Attorneys use a similar approach by having an array of boilerplate language to add to customized legal documents.

Standardized production does not have the experience curve problem but can have its own problem of not accommodating customer variation. A common solution is to produce standardized products that are *customizable*, meaning that customers can easily reconfigure the product for their idiosyncratic needs. An example is an iPhone. At any given time, Apple only sells a handful of iPhone models to a massive customer base with a wide variety of needs. The success of the iPhone largely rests in the ability of customers to configure their devices on their own (DIY production) or using Apple's App Store (self-service production).

Self-service production has the advantage of great accommodation of customer variation (P1) but does not do as well in terms of expertise (P2). Customers are less experienced and thus may have less expertise than specialized providers, which is another implication of the experience curve effect. In some cases, expertise is common and easily attained by customers, such as checking in for an airline flight. However, if expertise is not as common, customers may experience frustration, and the process may require inefficient employee intervention (i.e., synchronous co-production). One example can be self-checkout at grocery stores. Although produce is increasingly being tagged with barcodes, the customer experience of scanning items can sometimes be wrought with frustration, tempting customers to wait in line to be served by one of the few remaining cashiers.

One way to compensate for the expertise limitations of self-service production is to train customers so that they can more rapidly acquire the requisite expertise. Providers should recognize that every self-service technology should also be a customer-training tool. For example, Google's Gmail platform periodically pops up info boxes on the app to notify users of new features or features new customers may not have encountered. Interested users can click on "Learn more" links to receive instruction.

Another way to compensate for the expertise limitations of self-service production is to use technologies that adapt to individual customers' needs and provide expert judgment as a human expert would. This is among the most significant applications of artificial intelligence (AI). For example, the hallmark of Netflix has been the AI that recommends movies and shows based on individuals' past viewing habits, supplanting the expertise of cinephiles who used to work at video stores. AI that will replicate the expertise of physicians and attorneys is coming close to reality.⁸¹ Still, we would be remiss if we did not emphasize how difficult this is to accomplish. Investing in AI can be expensive and risky, which can lead to competitive advantage for those who get it to work.

Positioning Questions to Consider

Deciding where to optimally position a production process is not an easy task, but it is essential to sustainability. The fundamental strategic decisions are who should be responsible for controlling different aspects of production—the provider and/or the customer—and how much interaction is necessary. We think of this in terms of the *provider's process domain* (parts of the process controlled by the provider) and the *customer's process domain* (parts of the process controlled by the customer), with interaction at the intersection of process domains. The following are questions to consider in identifying the optimal production positioning.

1. *Do customer needs vary in ways that require customized offerings?* If not, the optimal alternative may be standardized production, which is fine if done in a way that is as efficient as possible. For labor-intensive processes, this may involve locating production in a low-labor-cost region of the world. For automated processes, this may involve a big investment in technology, meaning that providers may need a large market share to justify that investment. However, if customized offerings are required, then the question shifts to how much customer participation will be necessary. Simple customization can often be handled by customized production, which can be little more than superficial changes based on customer needs. More extensive customization requires greater customer participation and may require moving production into the customers' process domain, that is, self-service or DIY production.
2. *Does production require expertise or specialized equipment that is not accessible by most customers?* If so, then we do *not* want to turn production over to customers, which is good for securing the role of the provider. Expertise and specialized equipment are examples of economies of scale, which put customers at a production disadvantage by serving only their own needs. Providers not only have an advantage of scale but can also build their expertise through their experience meeting the needs of other customers. However, if the production requires expertise that is common, and if there are no other economies of scale, it may be necessary to support DIY production or perhaps shift to self-serve production. In addition, it may not bode well if competitors move there first. Supporting DIY production involves selling customers the resources they need to meet their own needs without interaction—other than helping customers acquire the necessary resources. Self-serve production requires that customers have slightly more dependence on interaction with the provider. The decline of various interpersonal services (banking, travel planning, retail, and perhaps soon education and healthcare) can be attributed to this migration to the customer's process domain. If there is one thing the COVID-19 pandemic has taught us, it is that with the right resources, customers can get along quite well with minimal interaction with businesses.

Table 3 contrasts these first two questions across the five production types. Note that the production type that provides for high customization and high expertise is synchronous co-production, which is rationalized by a third question.

TABLE 3. Production Positioning Considerations.

	Provider's Process Domain (provider controls production)		Customer's Process Domain (customer controls production)	
	1. Standardized Production	2. Customized Production	3. Synchronous Co-production	4. Self-Service Production 5. DIY Production
Positioning factor				
1. Variation in customer requirements	<p>Low. Customers are satisfied with relatively standardized offerings.</p> <p>High. Customer needs vary in a way that requires customized offerings.</p>			
Examples:	Automobiles, computers, and video game consoles			
2. Expertise or specialized equipment requirements	<p>High. Production requires skills or equipment not accessible by most customers.</p> <p>Low. Skills and equipment are commonly available to most customers.</p>			
Examples:	Most customers do not have the skills or equipment to make their own clothing, sports equipment, or domiciles.			
How to compete	Offer lowest cost through location or automation.	Establish agile production enabled by automation.	Foster strong customer relationships that justify inefficiency.	Provide AI or other tools that empower customers.
Examples:	Nike reduces costs by contracting with production facilities in Asia.	Shutterfly produces photobooks using photos uploaded by customers.	High-end hair salons know their clients and cater accordingly.	Home Depot offers free DIY training classes to consumers.

Note: DIY = do-it-yourself; AI = artificial intelligence.

3. *Does the production process require both customization and economies of scale (e.g., uncommon expertise)?* If so, then perhaps synchronous co-production may be justified. However, providers should never loiter in synchronous co-production unless it truly does require a high degree of both—otherwise, it is too costly. If customization dominates expertise, consider moving to self-service production. If expertise dominates customization, consider moving to customized production. This caution leads to a fourth question.
4. *How much interaction is necessary?* Providers need to avoid the somewhat-dubious assumption that customers patronize them for the friendly employees. Maybe that is the case in the short run, or for lonely customers. Ultimately, most customers are not willing to pay for superfluous interpersonal interaction. They want their needs met as efficiently and effectively as possible so that they can instead spend their time on what they want, such as interacting with friends and family.
5. *Can we achieve balance and compensate for production positioning compromises?* The ideal production positioning would provide maximum customization, maximum expertise and economies of scale, highly enhanced relationships, and tremendous operating efficiency. While this is not likely to happen, there are balanced alternatives. We have described how customized production and self-service production provide balance advantages but also some disadvantages. We also described ways of managing the trade-offs by limiting customization, preparing for rapid customization, using AI, and training customers. These and other innovations can be used to reduce the negative effects of positioning compromises.
6. *Do different customer segments require different production positioning?* Again, we emphasize that any given firm will have a portfolio of production types, and what is optimal for one customer segment may not be optimal for other customer segments. For some offerings, it may be necessary to take an omnichannel strategy, at least during a transition, by offering different production types for different distribution channels. Dell does this for computer hardware, providing highly standardized offerings for cost-conscious consumers and interaction-rich and customized offerings for enterprise clients.

As another example, we revisit the options for planning a Disney Parks vacation. Disney can realize economy-of-scale advantages by providing standardized vacation packages with predetermined hotels, transportation, and park visits, but customers may want more customized offerings that include non-Disney elements (principle P1). Customers can DIY their vacation plans without help from Disney or another provider and get exactly what they want, but with a lot of effort doing research (P2). Customers might call a Disney travel agent and get expert help, but at a high labor cost (P4). A balanced alternative would be providing customers with a self-service vacation planning tool that helps customers plan a vacation suited to their unique preferences, perhaps supported by custom

planning advice from experts responding to customer inquiries. Still, there may be some customers who want total (DIY) control of the planning process and others who are willing to pay for engaging an expert in synchronous co-production, meaning an omnichannel strategy may be warranted.

Navigating the Evolution

While there are optimal production positionings for specific customer needs in specific competitive environments, the optimal positioning is likely to change over time. What was optimal and profitable at one point in time may be later unprofitable. As such, companies' production positioning may evolve as conditions require. See the online appendix for the example of the software company Instructure.

This is illustrated by the evolution of IBM. Earlier, we described how IBM experienced the servitization paradox. Here is more of the story. In 1911, IBM began with standardized production as a manufacturer of office equipment. Over the years, IBM developed many breakthrough technologies such as disk drive storage, DRAM memory, and the personal computer. IBM profited from these and other new technologies, but eventually patents expire and commoditization sets in.

In the 1930s, product sales stalled during the great depression. IBM made a strategic shift to services beginning with a 1935 contract to maintain employment records for the U.S. Social Security Administration that included customizing IBM products to their specifications.⁸³ Initially, these customized production services were simply a means for selling more equipment but eventually evolved into full-fledged IT outsourcing where companies turned their IT employees and functions over to IBM—what eventually became IBM Global Technology Services (GTS). This servitization shift (shown in Figure 4) shored up revenues and established IBM as a leader in the data processing era. This service growth accelerated in the 1970s as IBM began selling services separate from hardware and software (“unbundling”).⁸⁴

In the early 1990s, IBM teetered near bankruptcy as products experienced further commoditization. CEO Gerstner rescued IBM by diving even deeper into services that were not tied to IBM-produced equipment.⁸⁵ This was facilitated by spinning off divisions that focused on standardized production. IBM sold its hard drive business to Hitachi in 2002 to help fund the purchase of PricewaterhouseCoopers's Technology Consulting practice (synchronous co-production) which boosted IBM Global Business Services (GBS) revenue.⁸⁶ This further servitization shift is depicted in Figure 4. The sale of the personal computer division and the X86 server division to Lenovo, in 2005 and 2014, further reduced IBM's dependence on standardized production and enabled the building of GBS.

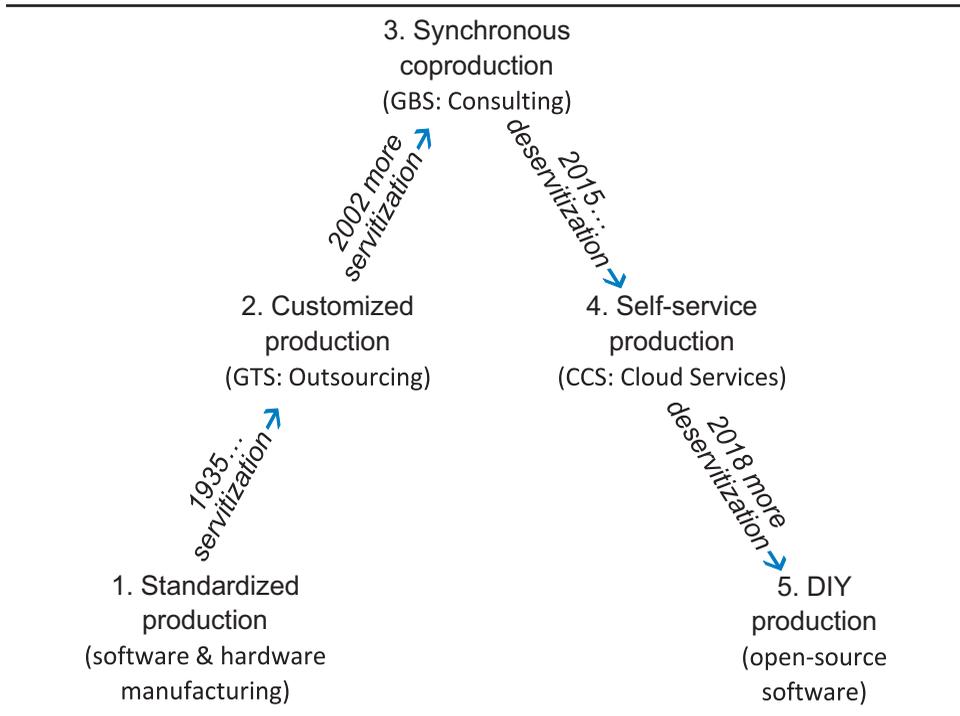
The GBS consulting practice bolstered revenues but with substandard profits, which is the servitization paradox described earlier. In response, IBM has gradually deservitized toward self-service production in the form of Cloud & Cognitive Software (CCS), where customers run advanced applications on IBM

platforms, including Watson supercomputers. This has been supported by acquiring (in 2015-2016) self-service platforms such as Merge Healthcare, Cleversafe (cloud storage), and Ustream (video conferencing). In 2015, IBM got further out of standardized production by offloading semiconductor manufacturing to GlobalFoundries.

IBM further deservitized into DIY production by supporting open-source software development such as Red Hat Linux, which IBM acquired for \$34 billion in 2018. Open-source implies that the software is not proprietary and can be customized by customers, potentially allowing them to meet their unique computing needs at lower cost (P1). This extreme deservitization introduces a risk of weakening IBM’s relationships with customers who can use the software independently from IBM (P3). IBM is banking on customers using software such as Red Hat “OpenShift” in conjunction with IBM’s cloud services in what is referred to as a “hybrid cloud.” In essence, IBM is implying that the expertise and economy of scale deficiencies (P2) of DIY production will motivate customers to use IBM’s cloud services and related software. So far it seems to be paying off.

Thus, the IBM journey has spanned the gamut of production positioning options, as depicted in Figure 4. At this writing, IBM’s two largest divisions are GTS (customized production) and CCS (self-service production)—the desirable

FIGURE 4. IBM's production positioning journey.



Note: GBS = Global Business Services; GTS = Global Technology Services; CCS = Cloud & Cognitive Software; DIY = do-it-yourself.

regions that are “off the ropes” away from the extremes. GTS continues to be IBM’s largest division providing 35% of revenues, which have been on the decline.⁸⁷ CCS accounts for 32% of revenues, which have been growing. Perhaps more telling is profitability—GTS’s pre-tax margin in 2020 was a paltry 0.4%, whereas CCS generated 24%. No wonder IBM leaders declared that “IBM is redefining its future as a hybrid cloud platform and AI company.”⁸⁸

In October 2020, IBM management announced that GTS would be spun off as a separate company, Kyndryl, allowing IBM to focus on the self-service division, CCS. This is probably wise since those two divisions competed against each other. The difference is whether clients need a provider to run the systems on their behalf (GTS/Kyndryl) or prefer to operate their own data systems on a cloud platform using IBM software services (CCS). These self-service platforms are becoming more capable and customers have been developing their own expertise, making self-service an increasingly attractive option.

Conclusion

How close should you be to your customers? In other words, how much interaction should you include in your offerings? How much should customers be expected to participate in production processes? Moreover, when is it advantageous or expedient to change production positioning through servitization or deservitization? Our framework can be used to help companies of all types navigate these difficult strategic decisions.

Our framework posits that too little customer interaction can lead to decoupled relationships with customers and to commoditization. Customer relationships can be enhanced by increased customer interaction (i.e., servitization), but too much interaction damages operating efficiencies, leading to the servitization paradox: increased revenues without a corresponding increase in profits.

Full-service companies that provide high levels of customer interaction often attempt to stay cost competitive by reducing or automating customer interaction (i.e., deservitization). Entire industries have been transformed by deservitization in recent years: banking, retailing, tourism, and hospitality, to name a few. This type of deservitization gives customers more involvement in controlling the production process, which helps customers get things exactly how they want. It implies that firms do less for customers and instead provide customers with the means to do things for themselves.

Thus, the optimal amount of customer interaction and participation in a business operation will depend on trade-offs between the competing factors. To stay competitive, firms must assess which factors are most salient at any given point in time, recognizing that customers and industries evolve over time. Even a given offering may require different amounts of customer involvement at different stages of production or for different customer segments. These customer involvement decisions can be complex, but ignoring them can be perilous.

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