Chapter 19
Visualizing and Improving Service Processes with PCN Analysis

Scott E. Sampson

Abstract This chapter introduces the service design and improvement tool known as PCN Analysis. PCN Analysis focuses on the ways in which processes can be strategically designed to leverage interaction between firms and their customers. PCN Analysis visualizes and optimizes along elements of customer value, provider value, customer-provider interactions, customer roles and responsibilities, provider and customer resources, and interconnectivity of service networks. Potential objectives of PCN Analysis include improving process control, leveraging expertise and other economies of scale, improving process efficiency, and increasing the potential for customization. These objectives are achieved through a method of "strategic process positioning," where processes alternatives are explored and design implications are considered.

Keywords Service design · Service improvement · PCN Analysis

19.1 Introduction

In this chapter, we add some science to the art of service design and innovation. The method we will present is a structured approach that involves documenting a context for innovation, ascertaining customer needs and improvement opportunities, enumerating service configuration alternatives, and identifying superior alternatives. This method has been taught to undergraduate, MBA, and Executive MBA students for a number of years with tremendous results. In all instances, students have been able to identify practical service innovations through this method, including innovations involving relatively complex service processes.

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The next section will briefly review the characterization services. The PCN Analysis methodology for service design will be reviewed as it pertains to service innovation. The concept of strategic process positioning will be expounded and examples will be described. Methods for applying PCN Analysis in systematic service innovation will be described through a case study. The penultimate section discusses extended applications of the methodology and a final section summarizes.

19.2 Services as Customer-Interactive Processes

Services have been depicted in research and academic literature in various ways. The most common traditional depiction of services is according to the so-called "IHIP" characteristics of intangibility, heterogeneity, inseparability, and perishability (Nie and Kellogg 1999). The IHIP perspective has fallen out of favor in segments of the academic community. Leading service management researchers have called IHIP characteristics "misleading", a "misrepresentation," and "service mythology" (Grove et al. 2003, p. 115; Lovelock and Gummesson 2004, p. 37; Vargo and Lusch 2004, pp. 326–327).

A different perspective views services as customer-interactive production processes. For example, Nie and Kellogg (1999) surveyed 197 operations management professors about their perceptions of services. Their survey revealed serious doubts about the managerial salience of the IHIP characteristics, instead revealing that customer contact/interaction/participation with service operations has the greatest impact on strategic decision-making.

This idea was espoused some time earlier by Chase, who provide a "customer contact" model of services that has numerous managerial implications (1981, 1983). Chase defined customer contact as "the physical presence of the customer in the service system," which he correlates with "the degree of interaction between [the service system and the customer] during the production process" (Chase 1978, p. 138).

Sampson and Froehle (2006) built on the customer contact model in the so-called "Unified Service Theory," which identifies customer contribution to a provider's operations as the universal distinguishing characteristic of all services. The requirement for customer contribution precipitates interaction between the customer and the service provider, either direct (person-to-person) interaction or indirect interaction (i.e., a provider interacting with customer-provided resources).

In this chapter, we will assume the view that services are *processes that involve coproductive interaction between providers and customers*. Specifically, we will consider the permutations of the coproductive roles between producers and customers. As Demirkan states, "A key characteristic of service innovation is that it often changes the roles of providers, coproducers, and customers of services and alters their pattern of interaction" (Ostrom et al. 2010, p. 15). That is the focus of our approach.

19.3 PCN Analysis: Tool for Service Innovation

The basis for our service innovation approach is PCN Analysis, a tool that was introduced by (Sampson 2012). That initial exposition of PCN Analysis reviewed the mechanics of PCN Analysis, compared it to alternate service design methodologies such as service blueprints and BPMN, and outlined managerial implications of service design alternatives.

That 2012 exposition explained how PCN Analysis could depict enabling and relieving innovations, but gave no indication about where the innovations came from. The present extension describes how an additional component of guided enumeration provides a more systematic approach to service innovation. In this section, we review general PCN Analysis concepts that subsequently will be used to identify and evaluate customer-interactive service innovations.

19.3.1 Process Regions and Relationships

PCN Analysis focuses on the ways in which processes can be strategically designed to leverage interaction between firms and their customers. PCN stands for Process Chain Network. A *process chain* is a sequence of steps that accomplishes an identifiable purpose such as building a home, completing a tax return, or repairing a computer. The *network* is the set of entities that are involved in a particular process chain, making decisions about parts of the process. A *process entity* can be a manufacturer, a service provider, a customer, an agent of a customer, and so forth. Each process entity has a *process domain* that includes the set of activities that the entity has control over. An example of a process domain for an auto detailing business is shown in Fig. 19.1, called a *PCN Diagram*. Auto detailing, "is the performance of an extremely thorough cleaning, polishing and waxing of an automobile, both inside and out, to produce a show-quality level of detail" (Wikipedia). In Fig. 19.1, the detailing step is shown with three sub-steps: wash car exterior, clean car interior, and wax car exterior.

The activities in the process domain are organized into three *process regions*:

1. The *direct interaction* region includes process steps that involve person-to-person interaction between entities. For example, a detailing employee directly negotiates with employees of an equipment supplier in purchasing detailing equipment.
2. The *surrogate interaction* region includes process steps in which one process entity is acting on another entity's non-human resources such as their belongings, information, or technologies. When the employees are detailing the customer's car they are interacting with the car and not directly with the customer.
3. The *independent processing* region includes steps in which the entity is acting on resources owned and controlled by that same entity. Many of the processes of make-to-stock manufacturing fit in this region. In the Fig. 19.1 example the

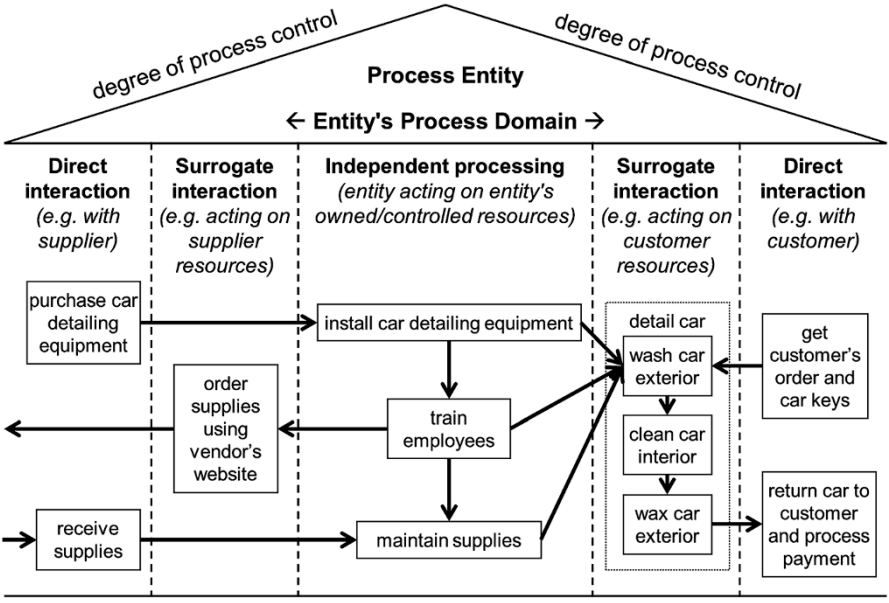

Fig. 19.1 PCN Diagram for an auto detailing business

provider installs their own purchased car detailing equipment. If the equipment supplier installed the equipment it would instead be surrogate interaction.

There are important managerial distinctions between these three categories of process steps. Process entities have more control over independent processing steps than they do over surrogate or direct interactive steps, due to the need to give up some control in order to interact. The slanted "roof" on a PCN Diagram reminds us of those different levels of control.

19.3.2 Customer-Interactive Processes

Since PCN Analysis considers networks of entities, it is more interesting to consider PCN Diagrams involving more than one entity. An important feature of PCN Analysis is not only understanding the provider firms' processes, but also understanding relevant customer and supplier processes that are part of the same process chain.

Figure 19.2 depicts how process entities involved in a given process chain can be linked together in a PCN Diagram. In that example, a focal firm interacts with a supplier and with customers. Note that this is different from a traditional supply-chain diagram, which typically have arrows to represent product flows from suppliers to customers. In a PCN Diagram the arrows represent the process sequence,

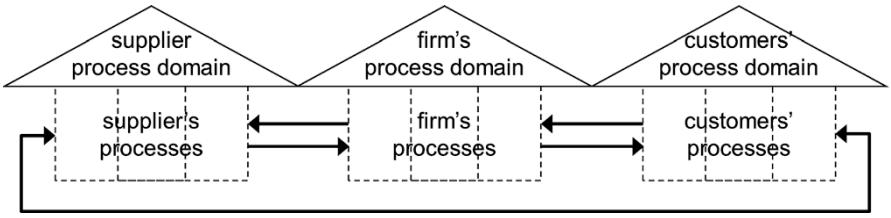

Fig. 19.2 Network of entities

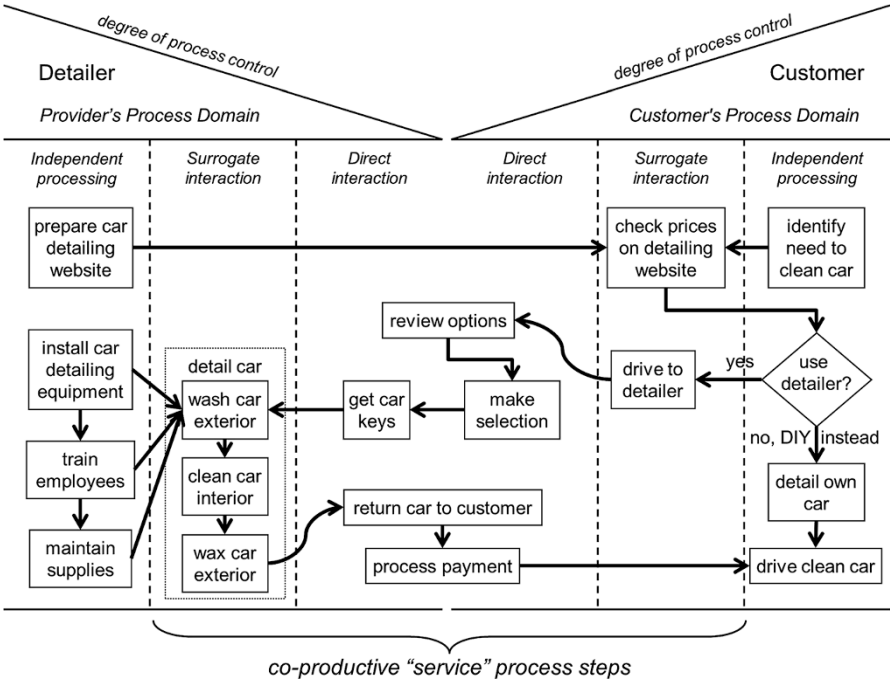

Fig. 19.3 PCN Diagram for an auto detailer and a customer

which can progress in different directions between entities at different phases of interaction.

Service networks can be depicted in various levels of detail in PCN Diagrams. A dyad relationship can be depicted by showing part of process domains of two entities as illustrated by the Fig. 19.3 example. Figure 19.3 shows an auto detailing service provider on the left and a customer on the right, with only the adjacent regions of interaction being depicted. In this example, the customer independently identifies the need for having his or her car detailed. The customer might check prices on the detailing firm's website, which is surrogate interaction with the detailing firm. In this

example, the customers may independently choose to use the detailing firm or "do it yourself" (DIY) at home.

Figure 19.3 also delineates the steps that meet the "service" definition outlined above, with two (or more) entities *coproducing* a given value offering. This emphasizes that service exists in the regions of interaction between entities, and that there are different types of interactions. Next, we will look how these regions can be used in service design decisions that will lead to service innovation.

19.3.3 Strategic Process Positioning

One aspect of PCN Analysis is "strategic process positioning" wherein specific portions of a process can be designed to deliver certain types of value or achieve desired operational characteristics. Process positioning is strategic in that it defines what type of business a firm is in and what value proposition the firm desires to provide to customers. For example, some firms assume a customer-accommodation strategy and other firms assume variance-reduction (standardized offering) strategy (Frei 2006). The functional strategies of a firm can be depicted in the process regions of a PCN Diagram.

Figure 19.4 shows five general regions of a two-entity (provider and customer) PCN Diagram. Regions #1 and #2 are in the provider's process domain, meaning that steps that fall in those regions are directly controlled by the provider. Regions #4 and #5 are in the customer's process domain, meaning that the customer directly controls those steps. Responsibility and control of steps in Region #3, direct interaction, are jointly shared between the provider and customer. Note that there can be different positioning of processes within Region #3, since some direct interaction is more controlled by the provider and some direct interaction is more controlled by the customer.

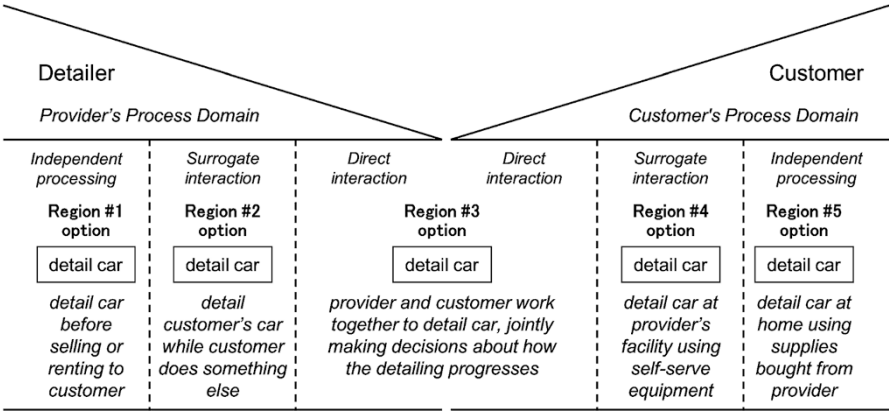

Fig. 19.4 Process positioning options for the "detail car" step

Also note that every process step has these five options, although some options may not be practical or make sense in a given context. For example, Fig. 19.4 also depicts various options for the "detail car" step. The Region #1 option is for the provider to detail cars before delivering them to customers, which is what rental car firms usually do. The Region #2 option has the provider detail the customer's car without directly interacting for that step. Detailing a car through direct interaction (Region #3) means the customer and provider work together, which might provide some educational benefit (training the customer in how to detail a car). The Region #4 option might be a self-serve detailing that allows customers to use the specialized equipment of providers but also take control of the process step. The Region #5 option is for the customers to detail their cars just using resources they own, as was suggested in the DIY option from Fig. 19.3.

Other options might be depicted in a more complex PCN Diagram that involves more than two entities. For example, the detailing service provider might outsource some of the "detail car" sub-step to other providers, such as cleaning and conditioning leather upholstery. See (Sampson et al. 2015) for an example of PCN Diagrams involving multiple entities in a healthcare context.

19.3.4 Characteristics of Process Regions

The search for service innovation will be guided by an understanding of the nature of process regions, including their operating characteristics and task requirements. This subsection reviews major managerial implications of each process region and points to related academic research streams. These implications are summarized in Fig. 19.5.

Region #1 (provider's independent processing) includes steps in which the provider acts independently from the customer and therefore has maximum process control—the provider can perform Region #1 steps when, where, and however desired. This is the region of make-to-stock manufacturing, where providers prepare goods in anticipation of subsequent demand, which of course has been studied in the extensive traditional operations management literature. It is the region of maximum economies of scale, making it ideally suited for process steps that require costly equipment or difficult-to-obtain expertise. It is also a region of high efficiency. Quality in this region is defined by planned or engineered specifications that are often tightly defined (Chase 1978).

Region #2 (provider's surrogate interaction) is what research literature calls the "back stage" of service delivery (Bitner et al. 2008; Herhausen et al. 2017; Zomerdijk and Voss 2010). Even though the customer is not physically present in Region #2, the customer's information or tangible belongings are available to be acted upon. Steps in Region #2 are beholden to customer demand, and therefore Region #2 has lower operating efficiency than Region #1 and also typically has lower capacity utilization, implying reduced economies of scale. However, Region #2 provides the opportunity for customization based on customer requirements.

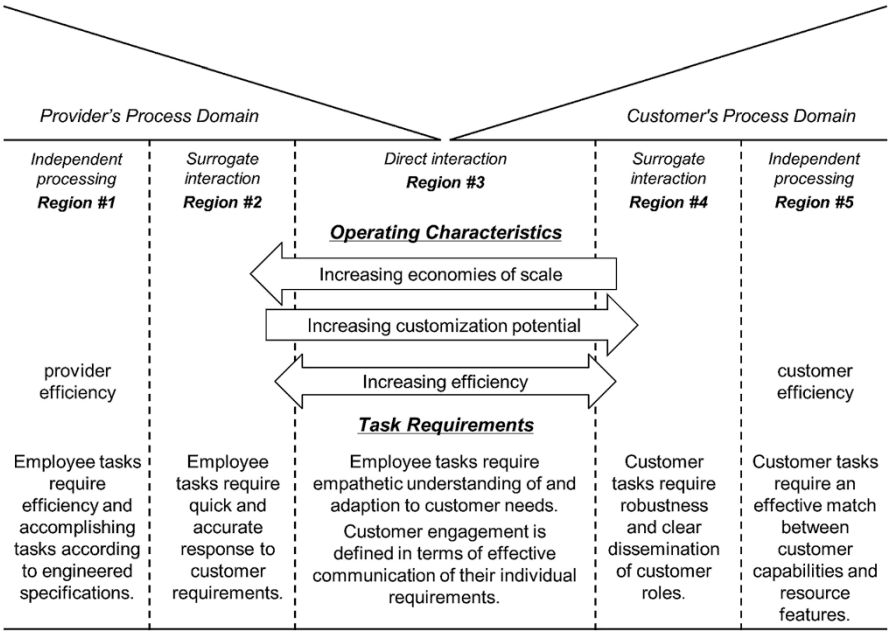

Fig. 19.5 Operating characteristics and task requirements across the Regions

Performance of employees and systems operating in Region #2 tends to focus on speed and accuracy in responding to customer requirements, within the scope of the provider's offering.

Region #3 (direct interaction) is the "front stage" of service delivery, where customers and providers are actively engaged in coproduction (Teboul 2006). It does not require colocation, but does require simultaneity of interaction, such as through phone conversation. The intensity of interaction results in this being the region of lowest operating efficiency, at least vis-à-vis the other regions (Roels 2014). This region is described in the extensive "customer contact" and front-line employee literature (Kellogg and Chase 1995; Wirtz and Jerger 2016). The interaction in Region #3 allows for greater customization than Regions #1 and #2, but that customization can cause process variation and thus reduce economies of scale. Performance of employees engaged in Region #3 is typically based on the ability to ascertain and respond to customer needs in accordance with the providers value proposition. This of course is dependent upon customers adequately communicating their requirements and accepting limitations of the provider's offering.

Region #4 (customer's surrogate interaction) has the customer acting on provider resources. A typical example is so-called self-service, where customers are utilizing provider resources or, as the literature calls it, self-service technologies (SST) (Meuter et al. 2000). One tremendous advantage of operating in Region #4 is that customer labor is generally unpaid. In addition, customers now have the opportunity to control the process and customize as desired. However, the ability

to perform in this region is limited by the skills and motivation of each customer (Xia and Suri 2014), and customers, operating only on their own behalf, have low economies of scale. When customer skills and motivations vary, problems can arise (Frei 2006). Therefore, processes operating in Region #4 need to be sufficiently robust to avoid high costs of customer inadequacy (Chase and Stewart 1994). In addition, consideration must be taken to clearly disseminate customer roles, which is part of customer development (Xue and Harker 2002).

Region #5 (customer's independent processing) is where the customer has acquired all necessary resources and is attempting to realize value without further interaction with the provider. It is the region of do-it-yourself (DIY) where customers attempt to act on their own (Norton et al. 2014). The DIY literature is less developed than literature about other process regions. A benefit to the customer of processes in Region #5 is maximum ability to control the process, implying the opportunity for maximum customization. However, that customization may be limited by the customer's ability to perform the process steps, since the customer may have little experience and intellectual economies of scale. Still, the customer benefits from high efficiency, since at that part of the process the customer is no longer dependent upon the provider for interaction or resources. A key performance element in this region is that the features of the resources match the customer's capabilities and interests.

These operating characteristics and task requirements are summarized in Fig. 19.5. There we see increased economies of scale into the provider's process domain, increased customization potential into the customer's process domain, and increase efficiency away from the region of direct interaction. One redeeming benefit of the region of direct interaction is that it allows for a blend of both economies of scale, such as provider expertise, coupled with the customer's ability to influence the process for high customization. For that reason, services such healthcare, education, and counseling traditionally operate through direct interaction. Nevertheless, demands for efficiency are pressuring these and other industries to move out of direct interaction, which can be a ripe field for innovation.

19.3.5 Examples of Process Positioning Options

As mentioned, every process step has these five process positioning options, although some options may not be feasible. We present a few examples as illustrations.

Figure 19.6 shows process positioning options for a step in a transportation process involving traveling to a destination. In Region #1 the traveler takes a subway, which operates independently from any customer. A bus is in Region #2, since the traveler can provide information—a stop request—that influences the way the service is delivered. The taxi service is in direct interaction, and is thus provides more customized travel than the subway or the bus. Alternatively, the traveler can rent a car and drive herself to the destination. Finally, the traveler could elect to drive

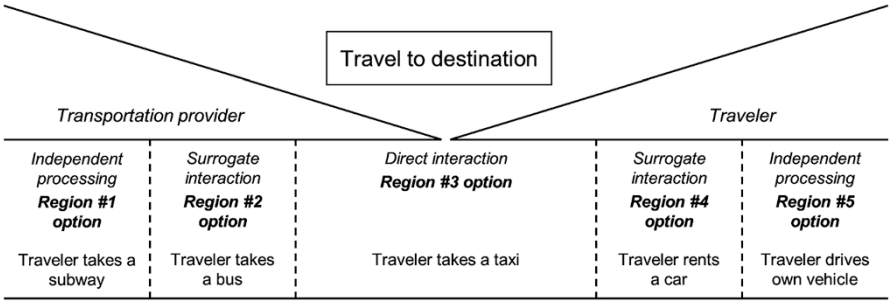

Fig. 19.6 Transportation process positioning options

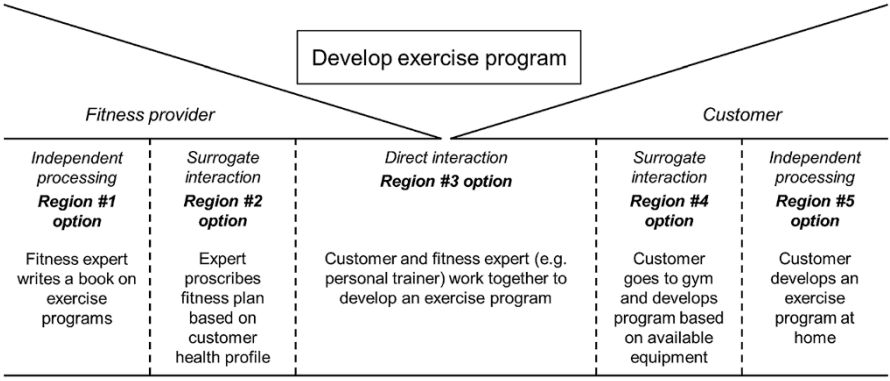

Fig. 19.7 Exercise program process positioning options

her own vehicle, the DIY option. The Region #5 option provides the lowest utilization and economies of scale, but the highest customization. Innovative service such as Uber and Lyft have allowed car owners to also operate in Region #3, thus increasing utilization of their vehicle resource.

Figure 19.7 shows process positioning options for the process step of developing an exercise program. The program could be developed independently by the provider and documented in a book that could be distributed widely (high economies of scale). Or, an expert could develop a program based on information from each client. Personal trainers might collaborate with clients to develop an exercise program in direct interaction. The customer may go to a gym and use the gym's equipment to develop an exercise program. Or the customer could simply develop their own exercise program at home, using her own resources.

Figure 19.8 depicts process positioning options for an entertainment process of selecting music. Radio stations select music without any ongoing interaction with listeners. Services such as Pandora select music for listeners based on their expressed preferences (including thumbs-up and thumbs-down for specific songs). Live disc

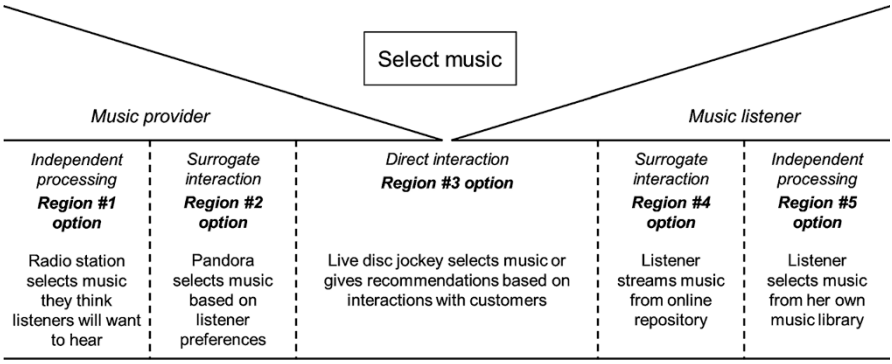

Fig. 19.8 Music selection process positioning options

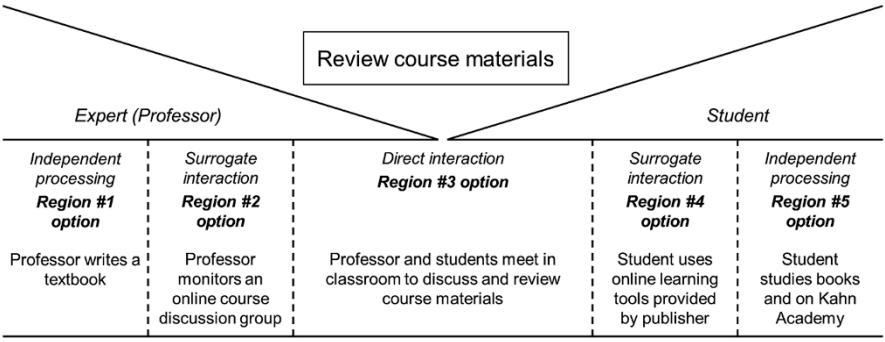

Fig. 19.9 Education process positioning options

jockeys interact with listeners to select music tracks. Listeners can select their own music either from an online repository or from their own music library.

Finally, Fig. 19.9 shows process positioning options for an education process of reviewing course materials. The expert can review materials by writing a textbook. The expert can review materials based on student inquiries posted to an online discussion group. The professor and students can review materials in a traditional classroom setting. The student can use online teaching tools such as Pearson's MyOMLab, reviewing materials at her own pace. Or, the student can review the materials completely on her own using books or resources such as Kahn Academy.

These examples are simply illustrations of the application of process positioning. In each case, you will observe that the greatest economies of scale are in towards the providers process domain, the greatest customization potential is towards the customer's process domain, and the lowest efficiency is in the region of direct interaction.

19.4 Process Repositioning Innovations

In this section, we will describe how to explore service innovation by shifting steps of a process across process regions, which is the concept of strategic process positioning described above. A logical basis for process improvement is identifying customer needs and "pain points" (Furr and Alhlstrom 2011; Kahn 2012), since the satisfaction of needs is the basis for customer value (Buttle 2004). Customer needs are often expressed in psychological terms as an emotional construct, with a desired outcome of innovation being an improved emotional response (Dasu and Chase 2010).

In PCN Diagrams, we depict customer needs and psychological costs with ☹ symbols. We depict the satisfaction of needs, or psychological benefits, with ☺ symbols. The ☹ symbols represent opportunities for enhancing customer value (value being depicted by ☺ symbols). Of course, customer value is dependent upon the chosen customer segment, with different segments having different needs and values. We recognize that this emoji method of depicting customer sentiment is quite simplistic, yet it has been shown to be very effective in practical application.

As we analyze process improvement opportunities, it is important to consider the impact on the cost structure of the firm. In PCN Diagrams we depict monetary revenues with +$ symbols and monetary costs with −$ symbols. The combination of +$ and −$ symbols represent the profit value of the process configuration.

Returning to the auto detailing example, one customer pain point might be driving to the detailing service provider and having to wait (perhaps an hour or more) while the work is done, which might be especially costly for busy people. A second pain point might be reviewing the numerous detailing service options, since the customer may feel they are being up-sold to more expensive options. Figure 19.10 shows (in double-border boxes) how those two pain points (in dashed boxes) could be addressed. First, the "review options" step could be handled on a mobile phone app, giving the customer more control over that step and improving efficiency. In other words, the process step is moved into the customer's process domain. This type of service innovation is what Normann and Ramírez (1993) and Normann (2001) referred to as an *enabling innovation* because it enables the customer to meet his or her own needs with (in this example) reduced need for direct interaction.

The "drive to detailer" pain point in Fig. 19.10 can be addressed by providing an on-location detailing service that is handled at the customer's location—what Normann called a *relieving innovation* because it relieves customers of responsibility for the step. (We are assuming this can be done in ways that do not produce undesirable annoyance in locations where cars are detailed.) In other words, relieving innovations are accomplished by moving process steps from the customers' process domain to the provider's process domain. Providing the at-customer-location detailing service would increase the provider's costs (−$) but could also provide increased revenue (+$).

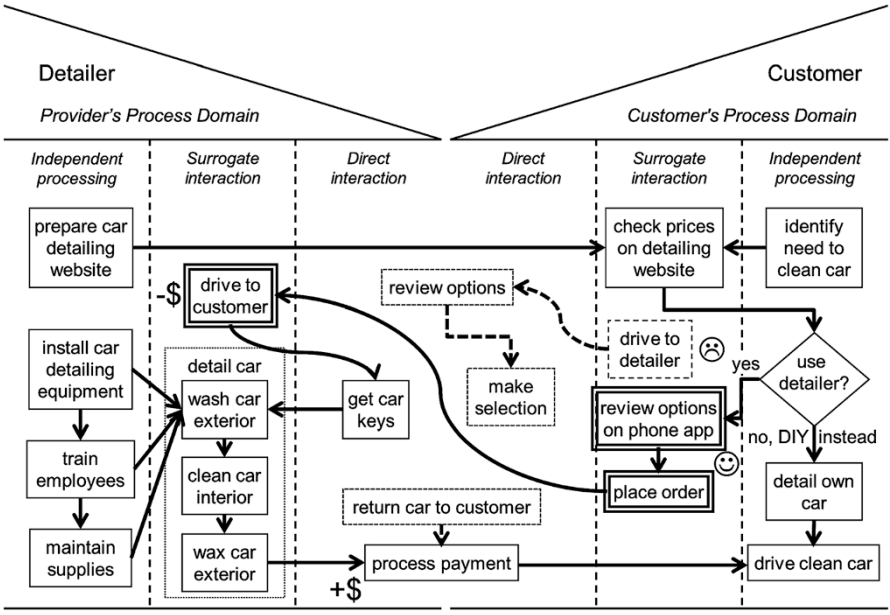

Fig. 19.10 Service process value-improvement options

19.5 Discovering Innovation Through Enumeration

A particularly beneficial application of PCN Analysis is coming up with process innovation ideas. Unfortunately, service innovation is sometimes treated as an unconstrained brainstorming activity with few principles to guide the thought process, especially at the fuzzy front-end of idea development (Alam 2006; Montoya-Weiss and O'Driscoll 2000).

We can use the concept of strategic process positioning to identify service configuration alternatives with superior operating characteristics and value propositions. This section will describe a four-step approach to identifying and evaluating possible service innovations: (1) document the steps of a base process, (2) select steps to focus on for innovation exploration, (3) enumerate and interpreting procession positioning options, and (4) identify configurations that achieve desirable operating characteristics. This process will be illustrated with a pizza restaurant case study.

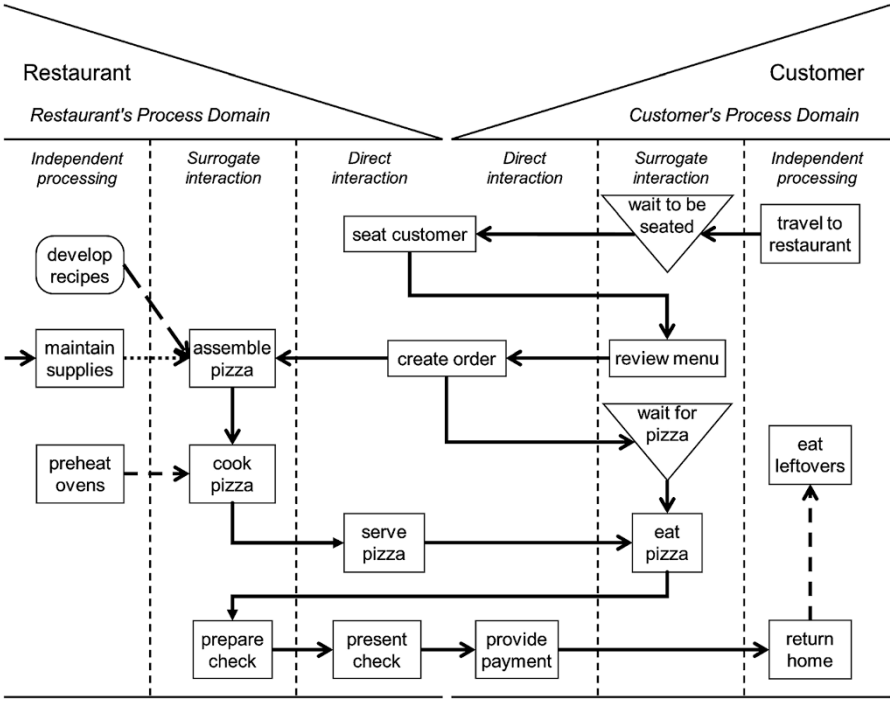

Fig. 19.11 Sit-down pizza restaurant PCN Diagram

19.5.1 Document a Base Process

We begin by identifying fundamental process chain elements that are necessary to deliver a desired offering. This includes identifying steps that would be included in a basic PCN Diagram. For our case example, Fig. 19.11 shows a PCN Diagram for a pizza restaurant, which is one possible process configuration.

19.5.2 Select Focus Steps for Innovation

Selecting process steps as targets for innovation involves identifying possible pain points or opportunities to improve value. We will not go through the value assessment process, but it was discussed above. Frankly, the selection of process steps can be somewhat arbitrary; since some types of improvements might not be obvious it can be beneficial to explore alterations to various parts of the overall process. Nevertheless, tractability is aided by studying processes a piece at a time when looking for potential innovations.

For the pizza example, we may decide to look for innovation at the two steps involving meeting the customer's order: "assemble pizza" and "cook pizza." It may be determined that a target customer segment desires either less expensive pizzas (which would come through greater economies of scale), or more customized pizzas.

19.5.3 Enumerate and Interpret Process Positioning Options

The next step of structured process innovation is to enumerate other process configuration options as described in the Strategic Process Positioning section above, then subsequently interpreting what the options would mean in a practical sense. For our pizza restaurant example, Fig. 19.12 shows five different process configuration options for each of the two selected steps.

The pizza could be "made-to-stock" meaning the pizza firm makes the pizza without any interaction with customers or information from customers. Make-to-order pizza is assembled in the back office according to specifications provided by the customer. "Make together" means the customer and the provider's employee interact to accomplish the process step. "Make it yourself" has the customer assembling the pizza, in this case by using resources owned by the provider. The rightmost pizza assembly option is for the customer to make it at home using resources the customer previously acquired.

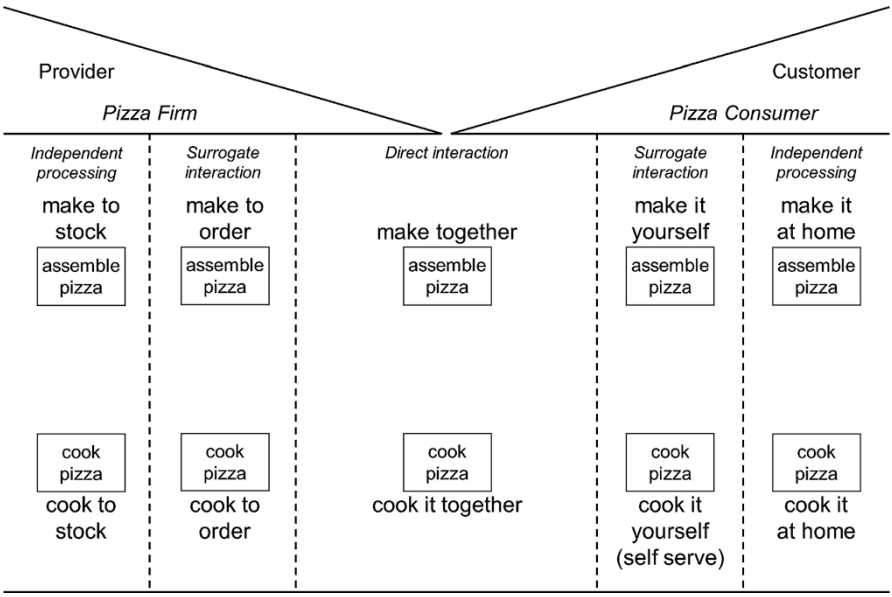

Fig. 19.12 Pizza process step alternatives

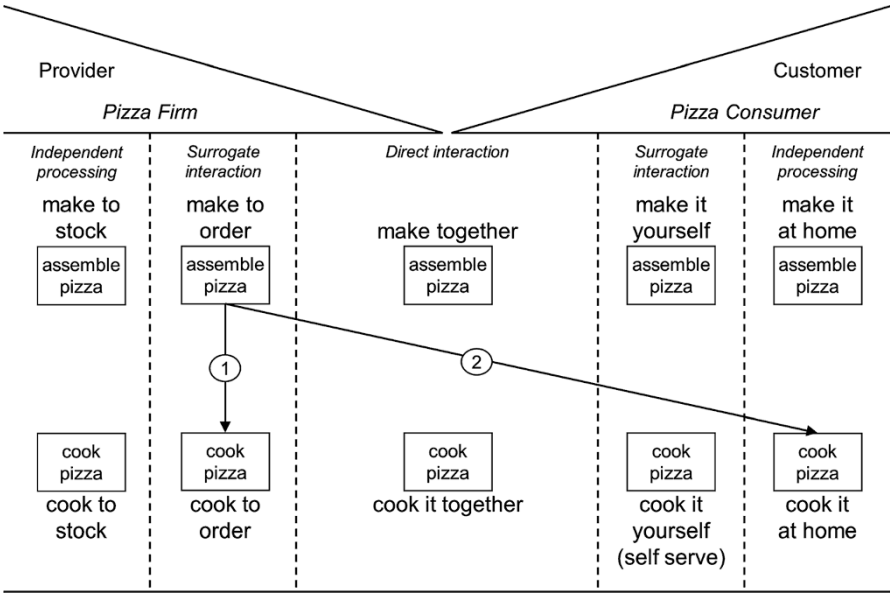

Fig. 19.13 Two pizza process configurations

Figure 19.12 also shows process positioning options for the cook pizza step. Considering just these two steps, how many design configurations could be created? There are five options for assembling pizza and five alternatives for cooking pizza, suggesting that there may be as many as $5 \times 5 = 25$ configuration alternatives.

For example, Fig. 19.13 shows two configurations. Configuration (1) has the provider assembling the pizza to order and cooking it to order, which is the configuration used in the sit-down restaurant (Fig. 19.11) and is also used in a take-out pizza operation. That configuration provides a reasonable degree of customization—such as allowing the customer to select pizza options from a menu with personal tweaks like "hold the anchovies." There may be less customization in the cooking, other than differences for thin or thick crusts.

Configuration (2) is the take-and-bake pizza process in which the provider prepares the pizza according to the customer's order and delivers it to the customer, who is responsible for cooking it. This configuration allows the customer to have more customization about when and how to cook the pizza. The customer can cook the pizza at his or her convenience. The customer can cook the pizza in an oven, on a grill, or over the coals of a campfire. The pizza can be cooked lightly or well done. This cooking alternative provides the customer with more control over the cooking process, but supposes that the customer has sufficient knowledge, skills, and equipment to complete the step.

There are even more possible configurations, four of which are depicted in Fig. 19.14. Configuration (3) has the pizza assembled and cooked with no input from customers, as exemplified by the Little Caesar's Hot-n'-Ready® pizza, which at

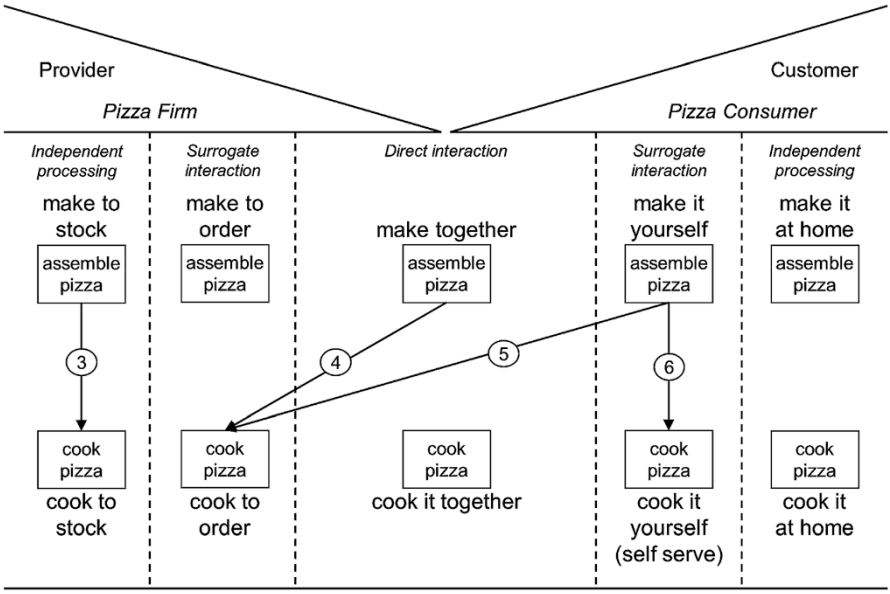

Fig. 19.14 More pizza process configurations

this writing sells for a mere $5 for a large pepperoni pizza—emphasizing the economy of scale and corresponding cost benefit associated with independent production. Configuration (4) demonstrates a highly interactive option comparable to the Subway® Sandwich mode of operation (at various times Subway has also sold pizza). Current examples of configuration (4) are Pizza Studio and PizzaRev.

Configuration (5) is akin to a Mongolian barbeque, which gives customers the option of assembling their food from a bar of components, and then having it cooked by trained employees. In one sense, configuration (5) is superior to configuration (4) when customers have specific dietary requirements or are picky eaters, since customers have even more control over the "assemble pizza" step.

Configuration (6) may not be common for pizza offerings, but is common in Shabu Shabu restaurants in Asia. Shabu Shabu is a Japanese food that involves a small cauldron of hot water (over a gas burner) for each customer, and trays of vegetables, spices, and thinly sliced meats. This configuration is in the customer's process domain, implying tremendous opportunity for customization but also assuming the required process competency is sufficiently accessible to target customers.

Figure 19.15 shows a couple of additional pizza process configurations. Configuration (7) is the staple of poor college students: pizza from the grocer's freezer, such as the ever-popular DiGiorno or Red Baron brands. These frozen pizzas are produced through the epitome of mass production, with tremendous economies of scale.

Configuration (8) ensures provider efficiency by requiring the customers to assemble their own pizzas. In this case, the provider may sell pizza kits that contain

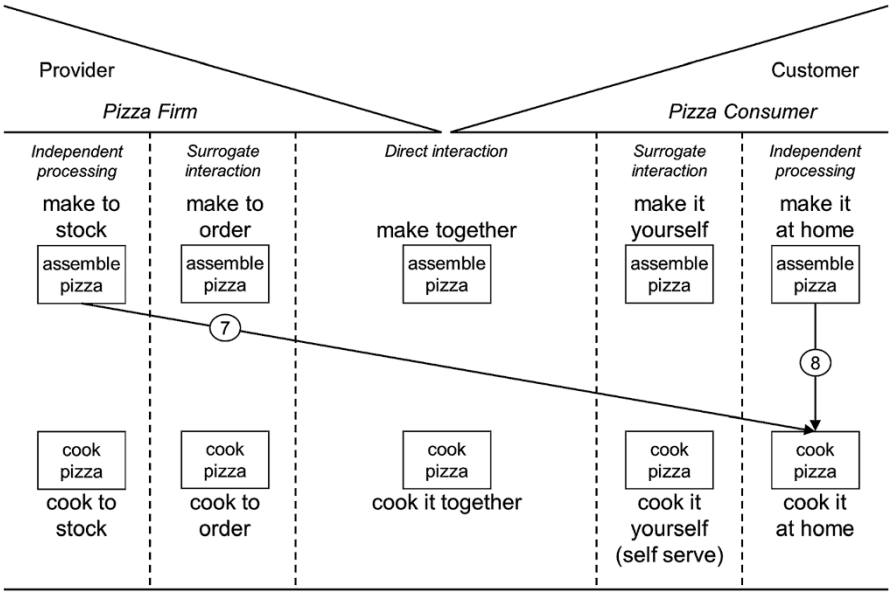

Fig. 19.15 Even more pizza process configurations

typical components and assembly instructions. The Papa Murphy's pizza chain introduced "Mini-Murph™" pizza kits targeted at kids.

19.5.4 Identify Promising Innovation Configurations

According to the process positioning principles described previously, configuration (7) is superior to configuration (8) in terms of economies of scale, but (8) is superior in customization. Having both operating characteristics in the same offering could be a tremendous innovation. An optimal process configuration should achieve different process characteristics at different points in the process, accommodating a customer segment's value requirements.

For the pizza example we may determine (such as through market research) that target customers value customization of pizza toppings, as well as control over where and when they eat their pizzas. However, that customer segment may be satisfied with a standard pizza crust, sauce, and mozzarella cheese. Our goal then would be to provide customization where it is valued (and can be recovered in price), and economies of scale where possible (to keep costs down).

Just such a configuration is shown in Fig. 19.16, which is an innovative pizza process that was initially designed by a team of undergraduate students (reprinted with their permission). These students had gone through the steps of reviewing an incumbent process configuration from which they might derive an innovative

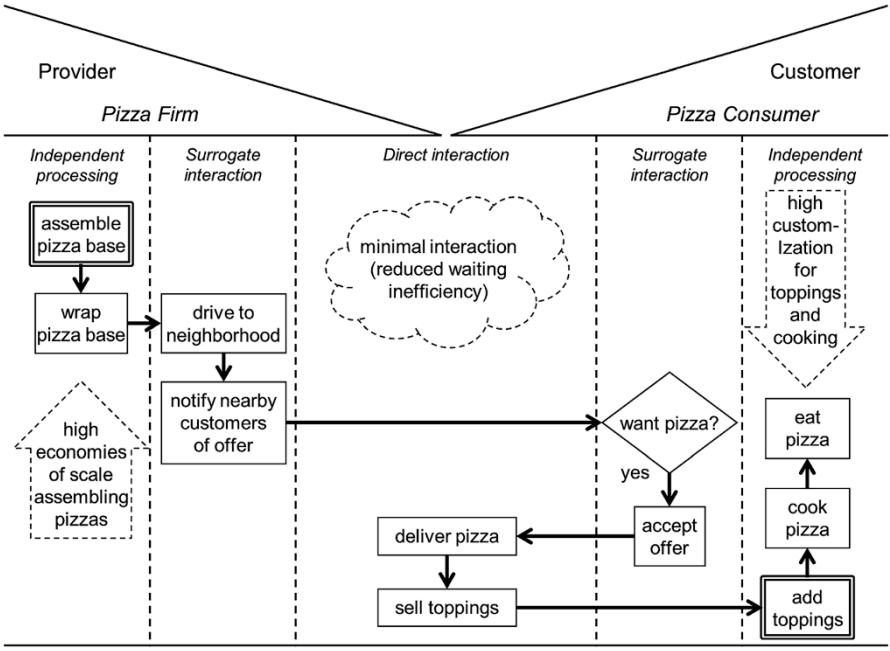

Fig. 19.16 Innovative process configuration

improvement. Their target customer segment, as you might imagine, was undergraduate college students.

The idea was that the pizza provider would assemble the basis of pizzas (i.e., crust, sauce, and cheese) in a centralized location with common sets of toppings or no toppings at all. They would wrap the pizzas to keep them fresh for delivery. The firm, which already owned delivery vans, would then drive stacks of pizzas to select neighborhoods in the surrounding communities. A smartphone application controlled by the driver would notify the smartphones of subscribing customers in close proximity to the truck (or to where the truck was going), announcing (via an app or a text message): "a fresh pizza is two minutes away! Do you want it?" The subscriber could text reply or tap a pizza-shaped app button on their smartphone signaling their interest in the pizza. Within minutes, the driver would arrive at the customer's door, delivering the pizza and selling small packages of toppings (the instructor's idea). The customer would then add toppings as desired, cook the pizza, and then eat.

Operating characteristics of this innovation include the following:

- The "assemble pizza base" step is centrally located in the provider's process domain for maximum economies of scale. This is optimal because the customer segment does not require any customization of pizza crusts, sauce, and cheese.
- The "drive to neighborhood" step is surrogate interaction, being based on data about where pizza-eating students live and when they typically want to eat

(probably all the time). This allows for customization of delivery while maintaining some efficiencies.
- Customers are notified via technology—surrogate interaction for efficiency.
- Customers reply and accept the pizza offer via surrogate interaction for efficiency and control.
- The pizza is delivered to the customer and sold through interaction. In particular, the customer can see the available topping bags and get advice and specials from the delivery person.
- The "add toppings" step is moved to the customer's process domain to allow maximum customization, such as placing toppings on only part of a pizza.
- The customer then cooks and eats the pizza fully within their process domain, for maximum customization.

19.6 Broader Applications of This approach

The above case example demonstrates how the principles of strategic process positioning can help us design and configure innovative service processes. In this chapter, we only considered innovation across a dyad, which is the simplest representation of a service relationship (Patricio et al. 2011). This innovation process can be extrapolated into innovations involving networks of entities, not just dyads. For example, one configuration option for the pizza restaurant might be to outsource pizza crust production to a manufacturer, providing even greater economies of scale. The crust manufacturer would be a third entity shown in the PCN Diagram.

The PCN Analysis techniques can easily be applied to service triads or more complex relationships involving multiple entities. For example, Sampson et al. (2015) demonstrate how to model service innovation in a healthcare situation involving patients, primary care physicians, medical specialists, transportation providers, and care coordinators.

Also, the PCN Analysis technique for innovation can be applied in various business contexts. Start-ups can use the technique to identify service delivery models that are distinct from what is offered by incumbent providers. Supply chain managers can use the technique to identify new ways to structure relationships with supply chain partners. Mature companies can use the technique to identify process reconfigurations that can be used to respond to evolving customer sophistication, such as due to the adoption of new mobile computing technologies.

19.7 Summary

This chapter described a systematic approach to service innovation using the PCN Analysis methodology known as strategic process positioning. We consider how steps of a process can be shifted across various process regions that have differing

operating characteristics and task requirement. Objectives of innovation might include increased economies of scale, increased efficiencies, or increased potential for customization. The attractiveness of each process region depends upon the value requirements of the target customer segment coupled with the operating requirements of the provider.

We reviewed the two types of interactive process innovations identified by Normann, *enabling innovations* and *relieving innovations*, and showed how they can be depicted on PCN Diagrams. Then we showed how new innovations can be discovered by process enumeration, guided by an understanding of the operating characteristics of each process region. We reviewed an example involving pizza production, and demonstrated that a variety of process alternatives exist. The same technique has been applied in numerous industries and contexts with insightful results.

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