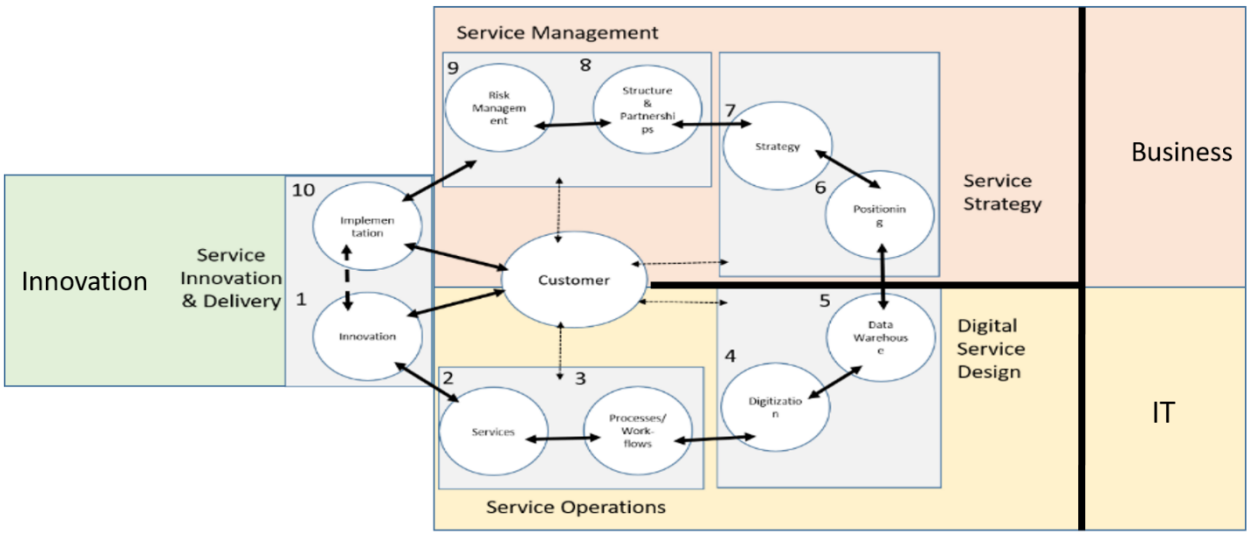
Digital Leadership ©

Service Driven and Customer Centric - A Methodology to Build an Agile System and Business Architecture

Business and IT Leadership: Customer Centric, Service Driven and Agility Focused



Mohan Tanniru, Ph.D.

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Chapter 1. Introduction

A business professional recently posed a question at a forum:

> "Why all this talk about customer-centric approaches and business transformation? Haven't businesses been transforming themselves to remain competitive for decades by analyzing what customers want?

The answer to the question is, "Yes." The goal of any business is to service the needs of customers for a price and generate a reasonable profit for that enterprise and its shareholders. The nature of business transformations, however, has been changing since the introduction of information technologies in the 1970s.

The information technologies of the 1980s and 90s transformed internal business operations by focusing on improved resource utilization and faster decision-making to better respond to customer needs. Some of these transformations also led businesses to extend their business value chain into supplier operations, so that they could improve the management of inventories and take advantage of global resources. The pace of change has increased since the beginning of the 21st century, with the rapid introduction of advanced information technologies (e.g. Internet/Web, mobile devices, wireless communication, and Internet of Things (IoT), among others) that enabled businesses to bring customer purchasing decision-making into the business value chain.

The growing use of mobile communication, social media, and the Internet is empowering customers to seek information, evaluate competitive products and services, and shift allegiances among competing firms to maximize their value. Rapidly changing technology and empowered customers are creating a market dynamic that is calling for agility in the design and delivery of innovative products and/or services, often using a mix of both internal and supplier/partner resources.

Firms have been using artifacts such as an "innovation sandbox" to allow employees, partners, and customers to develop innovative product/service ideas, and to use focused resources to assess their commercial viability. Such an entrepreneurial mindset often calls on a firm to "pilot test" ideas with customers before they are institutionalized as a part of the firm's regular business model. However, firms today are asked to move beyond "pilot test" approach and use a sustained two-speed approach to support business transformations using digital services that leverage advanced digitization. The two-speed approach calls for sustained use of a "faster speed" to continually look for innovative value propositions either to support the current business model or create new business models, or both. The sustained use of a "faster speed" needs agility in the system and business architecture to design and deliver digital services.

IT departments have been operating at two different speeds (Strategic vis-à-vis Operational) over the last three decades to ensure that IT strategies are aligned with evolving business needs. While the operational IT manages established or factory IT systems, the strategic IT uses an entrepreneurial mindset to design new digital services quickly to meet evolving business needs. Such a mindset today is calling for insight into the customer decision process using big data analytics, so digital services can be designed quickly using partnership of both internal business units and external technology partners. The entrepreneurial mindset used to design digital

services needs a complementary entrepreneurial mindset to deliver these digital services quickly to the marketplace. In other words, business leadership needs to not only develop innovative value propositions, but also deliver the digital services rapidly using a mix of both internal as well as supplier/partner resources. Such an entrepreneurial IT and business mindset is an organizational capability and is often characterized as having the right digital quotient to take advantage of advanced digitization opportunities.

McKinsey proposes six building blocks for creating a high-performance digital enterprise: *strategy and innovation, customer decision journey, process automation, organization, technology, and data analytics*. These building blocks are intended to allow a firm to use data analytics to generate innovative ideas that support a customer decision journey. They also help to operationalize these ideas by automating processes through advanced digitization and by bringing the resulting digital services to market using a management team organized and supported with a strategy. While the building blocks do identify many elements of system and business architecture that are required to support business transformation, they do not provide a systematic methodology to build agility into these architectures as an organizational capability.

To compete in this new market dynamic and operate at two different speeds requires three different types of leadership: *administrative leadership* to operate business at the regular speed, *enabling leadership* to operate at a faster speed, and *adaptive leadership* to bridge these two together through reflection and learning for sustained growth. Digital leadership is an "enabling" leadership that looks to create value for customers using advanced digitization and adapt innovations that demonstrate value into the organizations that is running at regular speed to sustain growth.

The digitization efforts start with a focus on creating value for customers ("customer centric"), and such efforts may indeed call for further digitization of internal business operations and the supply chain. These digitization efforts often use a service lens, i.e. they consider how digitization leads to improved services for the customer, referred to as "digital services." The digital services designed are to help improve customer interaction, engagement, and experience with the products/services the business is offering to create value. The primary goal of this manuscript is to develop a methodology that will help digital leadership (IT and business leaders) design and deliver digital services to create customer value.

We propose a 10-step methodology that builds agility into the way digital services are designed and delivered. This 10-step methodology enables "digital leadership" – a co-leadership of IT and business leaders – to develop an organizational capability that sustains innovation with technology and strategy. This 10-step methodology, shown in Figure 1.1, will use five distinct "service" components that are closely tied to customer value creation and preservation through sustained customer engagement.

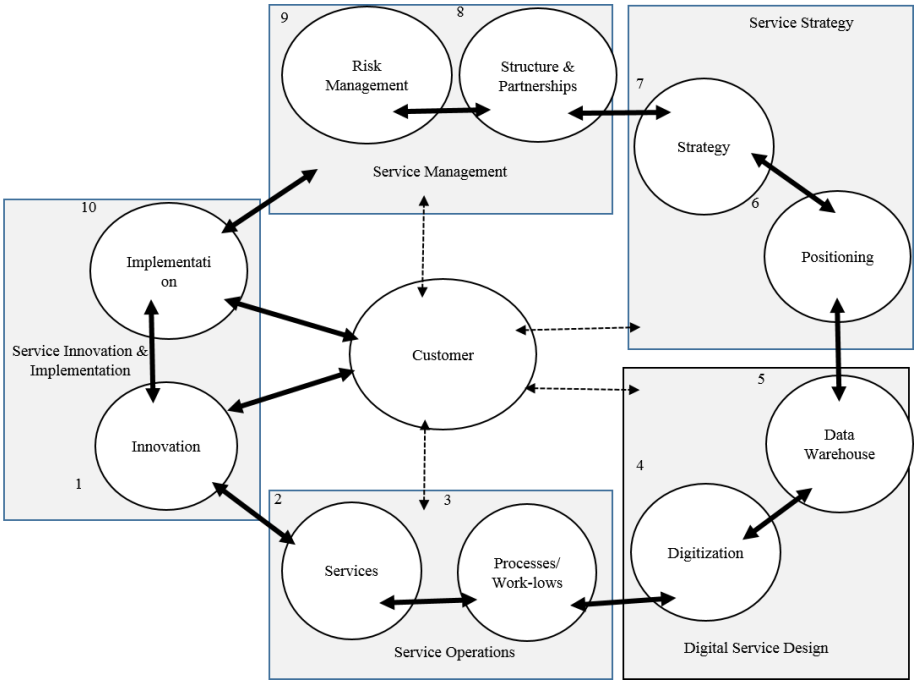
1. Service innovation and delivery (steps 1 and 10): Develop innovative customer value propositions, often co-created with customer engagement, which are reviewed/refined after implementation to sustain innovation.
2. Service operations (steps 2 and 3): Identify customer service interactions or encounters that incrementally and collectively influence customer engagement in value creation, and map

these encounters to specific processes/work-flows that are needed to operationalize these service encounters.

3. Digital service design (steps 4 and 5): Leverage advanced technology to automate select processes/work-flows to develop digital services, and build a data warehouse to analyze value delivered and gain keen insight into customer decision processes.
4. Service strategy (steps 6 and 7): Strategically position digital services to address a customer's competitive strategy.
5. Service management (steps 8 and 9): Structure a team that includes both internal employees and external suppliers/partners to deliver digital services for customer use while mitigating customer risks.

Note the customer focus in each of these service components. This is to ensure that the digital services designed and delivered are continually monitored to ensure that they are indeed focused on generating customer value. More importantly, such monitoring ensures agility in the way services are designed and managed for delivery, should customer expectations or technologies evolve. Lastly, by viewing the digital service as consisting of a number of individual service encounters, automation of each of these service encounters can evolve as technologies evolve.

Figure 1.1 Digital Leadership Methodology



Before we use this methodology, let us look at how businesses have transformed themselves to meet changing customer needs using information technologies over the last four decades, more importantly since the beginning of the 21st century, in the next chapter.

Chapter 2: Business Transformation Enabled by Advanced Digitization

Referring back to the question posed by the forum participant, businesses have always transformed their organizational activities to support customer needs, but the question is: How? Is there a systematic way to understand these transformations so that they can help inform how a business might address future transformations, especially to support sustained growth post exploration and adaptation? To understand past transformations, we will use two different lenses: a decision-making process, with "action" added (Figure 1), and a "simplified" version of Michael Porter's business value chain (Figure 2).

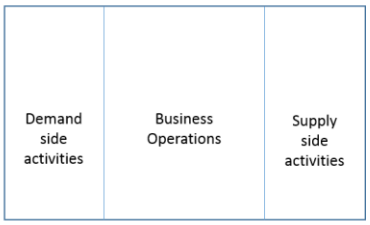
Herbert Simon, in his seminal 1947 work, identified these phases to describe the decision-making process: intelligence, design, and choice. The intelligence phase is intended to support the search for and gathering of all relevant information needed to make decisions. The design phase relates much of this information to a set of the decision maker's goals and operating constraints in order to identify a number of viable actions that can be taken, and the choice phase uses all information available to support the selection of a particular course of action. The action phase is added here to complete the decision-making process cycle, as all decisions eventually lead to actions that lead to future decisions.

The Porter's business value chain includes several primary activities that transform raw material or information into goods/services to create value, and that support activities that enable a business to organize itself to manage resources in value creation. Figure 2 is a simplified version, where all primary and support activities are grouped into: demand side (interfacing with the customer), operations, and supply side (interfacing with suppliers/partners). The demand side includes all customer facing activities such as marketing/sales, outbound logistics, and services (after sale), as well as support activities that support customer relationships. Similarly, supply side activities include inbound logistics, procurement, and other resources supporting supplier relationships. The operations include all activities involved in value creation using all appropriate resources (labor, material, capital, and technology), and their organization and management.

Pre-Internet Era Business Transformations

In the 1980s and 90s (much of the pre-Internet era), information processing technologies were used to realize resource-based efficiencies (or productivity improvements) and allow timely and effective decision-making. Many lower-level decisions, well defined by business procedures/policies within each unit, were transformed into what were referred to as "transaction processing systems" (e.g. payroll, order entry/processing, and accounts receivables/payables). These systems provided data that led to tracking of variance between planned and actual outcomes and supported management by exception (management information systems), and also supported future decision making by establishing new targets for business outcomes (decision support systems). Many of these systems reflected the transformation of a business at an individual department or unit level.

Figure 1. Decision Making Process + Action



. Figure 2. Business Value Chain

As customers, vendors, and other stakeholders demanded improved cycle-level response (order to collection, purchase to payment, etc.), businesses looked for transformations that improved process integration across multiple business units using enterprise resource planning systems (ERP). The common data collection and sharing across units through ERP systems transformed the way executives used variance on key performance indicators (return on investment, customer retention, order and procurement processing times, etc.) to transform organizational level decision-making using executive support systems. In addition, electronic data interchange (EDI) technologies were used to integrate supplier operations and transformed the way vendors managed business customers' inventories.

Independent of the terminology used to classify information systems, information technologies provided information from both internal and external sources to support business decision-making (intelligence phase), supported the modeling of processes within and across departments to help plan operational and managerial actions (design phase), and helped select the right course of action for implementation (choice phase). See Figure 3. Once actions were implemented, the data collected from various business transactions were used to analyze variance and adjust both short-term and long-term planning (i.e. connect action to intelligence). While the assessment of customer needs and purchasing behavior continued to drive managerial decision-making and internal business transformation to remain competitive, customers to a large extent remained outside the business value chain.

Post Internet-Era Business Transformation

Since the beginning of the 21st century (post-Internet era), advanced technologies helped extend the business value chain into the customer decision-making process, initially supporting customer "action" (e.g. placing an order and paying for it) and then later the other phases. As new technologies entered the marketplace at a faster pace, customers became empowered to use these technologies to support all their decision-making phases, allowing both current and new businesses to gain greater insight from customer decision-making behavior. This of course led to a significant transformation of business activities along the value chain, and the pace of these transformations will continue to accelerate into the future as current technologies mature and new ones surface.

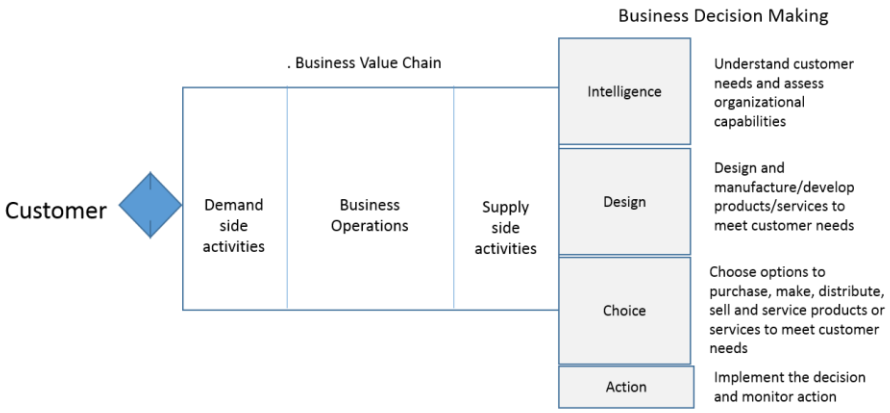


Figure 3. Business Decision Making Supporting Business Value Chain Activities

Without claiming comprehensiveness, let us use the customer decision-making process lens here to understand business transformation along the business value chain (shown in Figure 4). For our discussion, the demand chain activities are divided into marketing, outbound logistics, sales, and service. The "operations" activity includes both the value creation activities of the business as well as the supply chain activities, as we first focus on the transformation of "service" businesses. However, the supply chain activities are separated from "operations" when we look at the transformation of the "product" businesses. Figure 5 uses X-Y dimensions to tabulate the nature of transformations that have occurred since the beginning of the 21st century due to advanced digitization. The activities of the business are shown on the X-Axis, and customer decision-making phases are shown along the Y-axis.

Transformation of Service Industry – Demand Side Activities

With the introduction of the Internet/Web, more information was available to support customers' intelligence phase and action phases. Several digital service companies entered the marketplace to develop a web-frontend for businesses to help promote their services and allow customers to complete their action using business or other technology vendor sites (e.g. Paypal). With improved support for the *intelligence phase*, customers were able to incorporate product features and price information to support their design/choice phase (i.e. internally evaluate the product information against their goals and constraints: economic, social, etc.). The customers' ability to engage in the intelligence phase through web-based searches as well as complete their sales has transformed the marketing and sales strategies of many service businesses (e.g. airlines, hotels, restaurants, and several retail firms like clothing and toys).

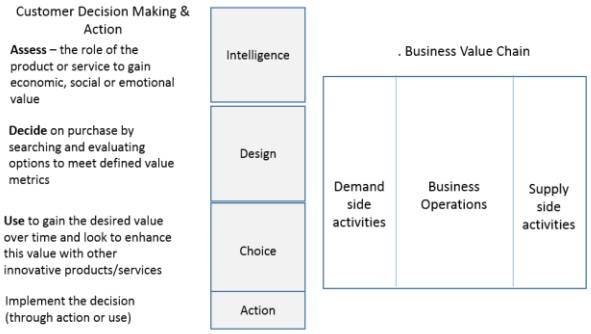


Figure 4. Customer Decision Making Supporting Business Value Chain Activities

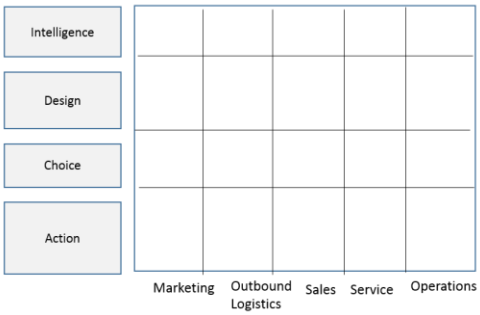


Figure 5. Segments of Business Transformation

This on-line customer engagement led to the first major disruption for those companies that sell commodity products like books, videos, etc. Given the short time customers spent in the design/choice phase of purchasing a book or a music video, once availability and affordability is established, the need for faster "action" took on a major importance. This led digital companies like Amazon and Netflix to support the distribution of books and video products, disrupting retail stores like Borders, Barnes & Noble, Blockbusters, etc. In fact, such disruption continues, with the fourth largest book store (Book World) deciding to close all its stores at the end of 2017. With some of the "content" digitized and distributed via e-books and on-line publishing (e.g. YouTube), disruption has affected many who have relied on digital content publishing businesses. The focus of digital companies here is to support the ***intelligence*** (gathering information) and ***action*** (supporting access to the product for education, entertainment, etc.) phases of the consumer.

Once traditional businesses started to develop their own websites to support their customers' intelligence phase using multiple marketing channels, and initiated on-line payment and home delivery options to support their action phase, many service businesses faced a new threat. With many websites supporting the *intelligence phase*, it became apparent that customers needed a more efficient way to incorporate all this intelligence to support their design phase: compare features of various businesses against their goals and constraints. Many new digital intermediaries (e.g. Travelocity, Priceline, etc.) entered the digital marketplace as integrators and aggregators of information and provided customers with a fewer number of options to choose from. Companies like Yelp have started to rate businesses based on peer review, and social media companies (Facebook, Twitter, Instagram, etc.) have allowed customers to share their experiences with other peers or social/affinity groups.

As these digital intermediaries or infomediaries begun to support the ***intelligence, design and choice phases*** of consumers, the marketing function within a business began to undergo a significant transformation. This deeper insight into customer decision-making behavior in real time (e.g. price, time of travel, etc. in airline travel; cost, service, and timeliness in delivery in product purchases) started to change the way services are priced (e.g. dynamic pricing), and niche markets were identified for market segmentation for differentiated service offerings. Real time data analytics, using the large amount of data made available by the consumer, has become a major part of this transformed marketing activity.

One of the challenges for a service business is the duration of the "service life cycle." Unlike the product life cycle (time from sale to repurchase), the service life cycle often varies. A customer going to a restaurant, movie, or on travel has a limited time before they may seek another service of a similar type. On the other hand, there are other service businesses that have a periodic life cycle (tax service, mortgage service, etc.), and others have a longer time duration (education service, health care service, etc.). The shorter and more ad hoc the life cycle of a service is, the greater the need for service companies to use analytics to continue to develop new or improved services to retain customer loyalty. Also, these service companies are more susceptible to negative customer ratings and service disruptions. The service life cycle differences and how they have influenced the transformation of operations of service businesses is discussed next.

Transformation of Service Business - Operations

Service businesses with periodic or ad hoc life cycles often have minimal demand-side activities (e.g. distribution of a knowledge product) and significantly knowledge intensive business operations. They often rely on a synthesis of information from multiple suppliers/partners using their business expertise (e.g. investment advice, mortgage service providers, realtors, consulting companies, etc.). The transformation of service business operations has occurred in two ways. 1) Knowledge tasks are shifted to the customer (e.g. e-Trade allowing customers to trade investment instruments and eBay allowing customers to manage trading of products/services). 2) Knowledge is commoditized or standardized and digitized to speed up access to this service (e.g. Quicken Loan supporting home loans, Turbo Tax supporting tax services, and Intuit supporting accounting services).

Service companies that have a shorter life cycle but have extensive capital and non-knowledge intensive labor (like hotels and taxi and restaurant services) have seen these operations disrupted due to advanced digitization as well. For example, by shifting the capital and labor needed to service a customer's needs (temporary housing and transportation) from "internally" owned to "externally acquired," Airbnb and Uber, Lyft, etc. have disrupted hotel and taxi companies. Airbnb brought many homeowners into the marketplace for customers to choose from at cheaper prices (if they are willing to take on some of the physical activities like cooking, cleaning, etc.). Similarly, Uber and Lyft brought many private automobiles into the market to meet the on-demand transportation needs of customers by offering better service tracking and a lower price. Companies such as Blue Apron and Hello Fresh are shifting some of food preparation to individual homeowners by distributing recipes and food ingredients, disrupting restaurant service businesses.

Some shorter service life cycle activities require customer engagement to be an integral part of the service company's operations, and the transformation of these operations has become somewhat sporadic and evolving. For example, service companies such as those in healthcare, education, entertainment, and recreation all need the customer to be a part of the service delivery operations, independent of how knowledge intensive they are (education and healthcare) and capital/labor intensive they are (recreation and entertainment). In each of these cases, the nature of transformation varies. For example, as more patients use technologies such as wearables and telehealth to self-manage their care or use new partners (e.g. urgent care centers) to distribute care,

hospital operations will continue to undergo transformation. Similarly, as more students take on capabilities to self-manage their education and learning at physical facilities of their own (home or work-place), on-line education will continue to transform the education service business.

Entertainment businesses have seen and will continue to see varied types of transformation depending on the nature of the product (video movies, sports, or other types of entertainment). The recreational service business still requires that the customer to be physically at the business facility (e.g. visit a park or a zoo) to enjoy the services, and the nature of transformation is more about when, where and by whom these services are sought. Lastly, government services are a mix of several of the other services discussed above, and the operations of a government are mostly a mix of knowledge and non-knowledge intensive activities in managing customer and supply chain relationships. Much of the transformation here, through e-government services, is to shift the citizen's role from passive to active by having them perform several of the tasks performed within the government offices, including motor vehicle registration, paying bills, obtaining licenses, and e-voting.

In summary, the demand side of service business transformation has seen changes in the way services are marketed, distributed, sold, and serviced post sales. With the improved using analytics, the operations side of service business has seen three major transformations: customer's willingness to undertake some of the service operations, the flexibility of the service business to shift its resources from "owned" to "sourced," and the degree of commoditization and digitization of the knowledge needed to provide the service. Figure 6 summarizes some of these demand and operational transformations of service businesses.

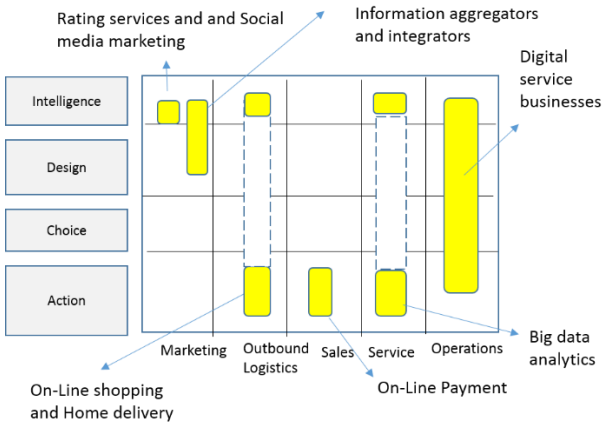
Transformation of Product Manufacturing Industry

The demand side activities of products are a bit more complex depending on how complex the product is. For example, one may require more time to evaluate the features and functionality of a home appliance or automobile, and require greater care in selecting food and wine. The degree to which the demand side activities of product businesses varies depending on how commoditized the product is. For example, an exercise machine with established features, computer and paper products, and household kitchen products (e.g. blenders and coffee machines) can be sold and distributed to consumers by Amazon, thus disrupting the retail stores that store these products from manufacturers (Lowes, Home Depot or Office Max). Similarly, used cars, bicycles and many other products can be purchased on-line using established reviews of these products (e.g. e-Bay, CarMax). In other words, the degree of transformation of sales and distribution of product businesses vary depending on how standardized the products are.

While the transformation of the sales function may vary depending on how the product is purchased (cash/credit or loan), the marketing function continues to undergo changes. Just as with service businesses, the customer's use of social media and other sources to gain intelligence about product features, do price comparisons, and share experiences (positive and negative) with others through product reviews, etc. have started to change marketing activity. The role of analytics, using both traditional feedback and non-traditional customer reviews and blog posts, has become the

norm today to understand and react to customer expectations if product businesses are to sustain their brand loyalty.

Figure 6. Digital disruption of Service Firms

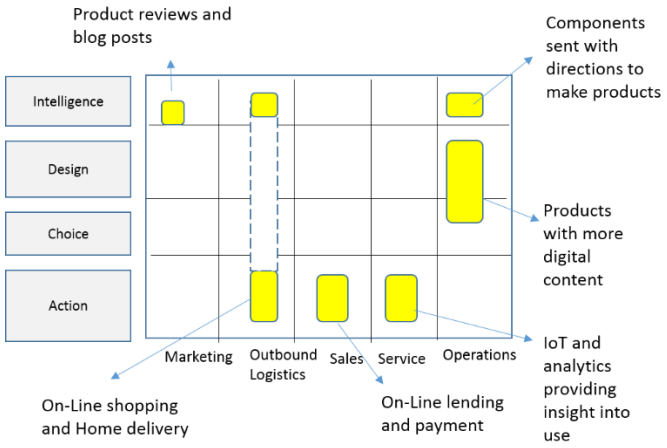


Given that the product life cycle is longer, services after sales have become important opportunities for transformation. AI and sensor technologies have started to provide opportunities to create alerts to support maintenance and order replacement parts (e.g. batteries) automatically. Also, complementary goods (e.g. detergents to be used in washers) have become a part of the service function to support use, and on-line digital tools (e.g. OnStar of GM) have started to provide significant insight into a customer's use of the products.

With the introduction of technologies such as the Internet of Things, product design has been transformed to support product in-use (e.g. on-demand alerts in improve security when customers are driving vehicles). As a result of advanced technologies such as AI and IoT, along with many infotainment products within automobiles, the digital content of automobiles has been steadily increasing, thus shifting product capital and labor from "owned" to "sourced" by technology suppliers/partners. With AI, and virtual and augmented reality reducing design time, robotics reducing manufacturing time, and 3D and Internet of Things (IoT) technologies influencing supply chain activities, the time to design and make products (e.g. automobiles, solar panels, and electric grids) has become shorter and less capital intensive. This makes entry into the product markets easier by newer players (e.g. Tesla in the autonomous vehicles market). Also, even conventional product companies today can design and make products for niche markets of a smaller size and still realize a reasonable profit, because the investment needed to support these markets is much less capital intensive.

Often referred to as industry 4.0, the manufacturing industry's transformation will continue as advanced digitization alters the way products are designed, speeds the manufacturing of these products, and automates the servicing of the product due to embedded digital content. Ultimately, the greater the understanding of customer decision-making and use of the products, the more improved the opportunities will be to co-create the value these products provide for sustained value creation. Some of the transformations of the product industry are shown in Figure 7

Figure 7. Digital disruption of Manufacturing Firms



In summary, returning to the question posed by the forum participant, businesses today, just like businesses in the past, will continue to meet customer needs. However, advanced digitization and the entry of many new players into the marketplace have increased and will continue to increase the pace of transformation of business activities along the value chain. Shifting the power of traditional businesses to influence the course of business transformation to remain competitive will be dictated not so much by the business alone, but by market forces, including empowered customers, new digital businesses, a greater number of digital suppliers/partners, and innovative digital product substitutes that cut into the value a business can provide.

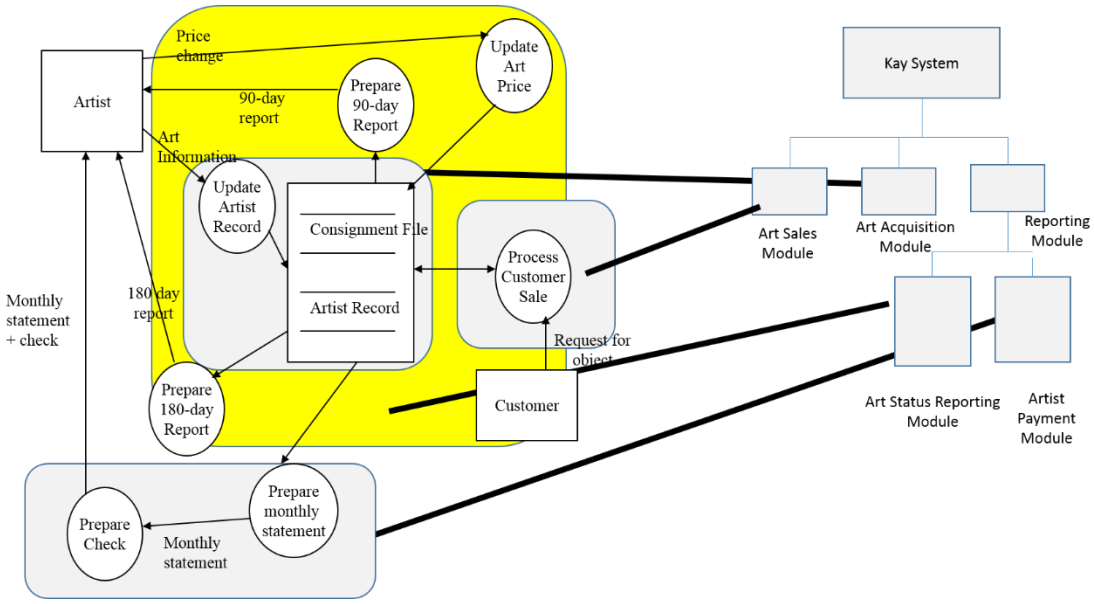
Chapter 2 Supplement – Three Cases to Describe Application Evolution

In the 1980's, firms have asked IT leadership to design systems that can address efficiency at a functional level (e.g., to reduce the costs of order processing, payables, and receivables), improve management control (e.g., exception reports that show deviations from budgets or plans), and support decisions (e.g., forecast sales based on historical trends and promotional strategies). IT systems were modularized for easy maintenance and adaptation in support of internal user or manager requirements, as firms addressed market demands. Figure 1.1 illustrates the automation of an art processing system at Kay's Originals (discussed below) using several software modules, each designed to support agility in meeting changing user requirements.

Kay's Originals is an art store that buys artwork on a contingency basis and sells it to its customers. The company stores art objects provided by an artist, and sells these objects on a contingency basis. The firm keeps the objects in the store for 90 days and, if they are not sold by that time, it sends a 90-day report asking for a decision on revising the price. An artist can either take the object out of the store at that time or reduce the price. If the object is not sold in 180 days, the object is removed from the inventory and the artist is notified in a 180-day report to come and pick up the object. At any given time, an artist can only have 10 objects at the most in the store. At the end of each month, the artist is sent a monthly statement and a check for all the objects sold in that month. The firm keeps 30% of the art price, if the object is sold within 90-days and 40%, if

it is sold in over 90 and under 180 days. When an object is brought in or when it is sold to a customer, appropriate files in the firm (artist and consignment files) are updated.

Figure S2.1 Kay's Originals - Business Unit Process Modules



While the focus of many business processes here is to support Artist, a supplier to the art store, one can imagine other business processes that can support a customer. If one were to improve processing efficiencies of all transactions that are designed to support artist interaction with the art store, these transactions can be grouped into:

- Art acquisition – Artwork of existing artists and those of new artists are accepted and recorded in the art file (contingency file) and artist file is updated (if there is a new artist).
- Art status reporting – The status of the art work post 90-day and post 180-day are communicated to the artist, and price changes for any artwork were recorded.
- Artist payment – A monthly tabulation of what is owed to the artist is computed and sent to the artist as a check along with a monthly statement, indicating the status of all the artwork
- Art sales – The sales of art work to customers is recorded and payment from the customer is collected.

Each of these transaction groups (or sub-systems) can be computerized, without any changes, to improve processing efficiency, and modularization of the computerized system can look like the hierarchy shown in the right side of Figure S2.1

As data is collected about the business in the artist and contingency files, reports can be generated monthly or on an adhoc basis (e.g. the type of art work that is selling faster, what art work is seeing significant price change by the artist, which artist's is not maintaining 10 pieces of

art work consistently in the store, etc.). Such information is useful for management to better utilize its potentially limited physical space by changing the mix of art work displayed in the store. Such reporting is often the focus of management information systems.

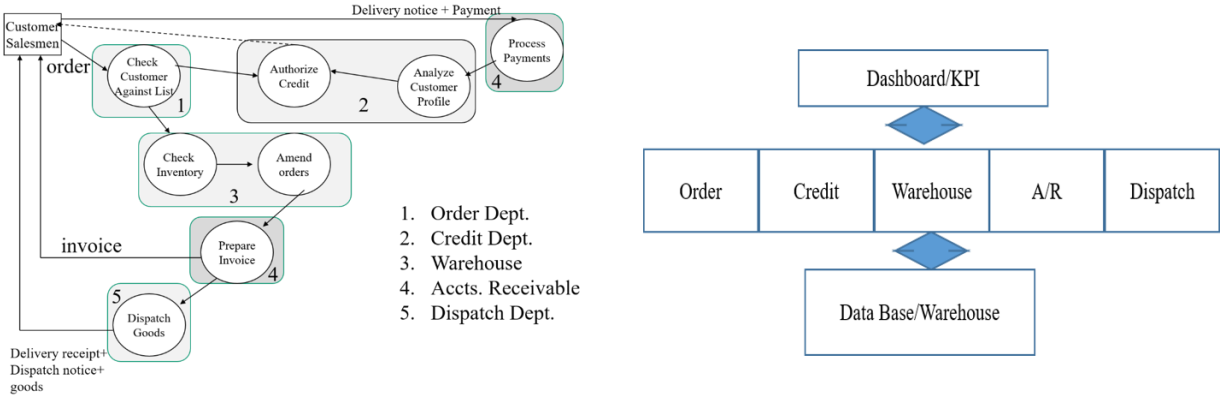
Such information can also help managers to make better decisions on which art work they should plan to stock more in the future (possibly based on seasonal demand), what limits they want to put on art work displayed by different artists (possibly based on popularity of the art work or artist), etc. Such forecasting is often the focus of decision support systems. We will revert back to the art store example throughout this manuscript we discuss how such an art store can innovate and transform itself to meet today's customer expectations.

As firms faced external demands from customers and suppliers to improve cycle time (e.g. order fulfillment time, vendor payments cycle, etc.), in the 90's, businesses had to integrate processes across various departmental units. Such process level integration was intended to help units share transaction data, so businesses can assess how well they are doing along key performance indicators (KPI) such as "time to complete an order" with drill down capability. For example, the time to complete an order can be decomposed into the time needed to place the order, fill the order and ship the order, so performance deviation can be isolated to units contributing to the deviation. Such unit level process integration has led to standardization of business processes often using best practices embedded in enterprise level information systems, often called enterprise resource management (ERP) software. Figure S2.2 documents the processes used by a retail distributor of Domel Ltd (discussed below). An integration of processes in order, credit, warehouse and dispatch units was needed to set order fulfillment goals (e.g. fill 90% of the orders in less than 2-days) and track performance deviation.

Domel Ltd wholesales a range of domestic electric appliances to stores and shops situated within roughly 200 miles of its warehouse. These appliances are purchased in bulk from manufacturers and importers, and resold to customers at low profit margins. Customer orders are received daily by mail and phone, both directly from customers and via salesmen. The order department personnel check the customers against an "acceptable customer list", managed by the credit department to see if the customer is on the list. For the customers on the list, the order is filled with stocks on hand. If stock is not available, the order is backordered automatically. If customers are not on the "acceptable customer list," they are provided the stock that is available and the order is modified for the appropriate items.

The dispatch department sorts the dispatch orders based on their geographical location and provide these to people with delivery trucks, assigned to different regions. The filled orders are used to prepare invoice and it is sent to the customers on the acceptable list. Those that are not on the list, the customers have to pay for the items upon the delivery of the order. Upon customer payment, the customer credit is adjusted.

Figure S2.2 Domel Distributors - Inter-Business Unit Process Modules



Major vendors such as SAP, Oracle, and, more recently, Salesforce.com have embedded "best practices" processes as software modules within their enterprise software system and have allowed customers to configure these software modules to reflect their unique business needs. The enterprise-wide databases will become a central source for extracting data needed by executive information systems using performance dashboards designed to track KPI with drill down capabilities.

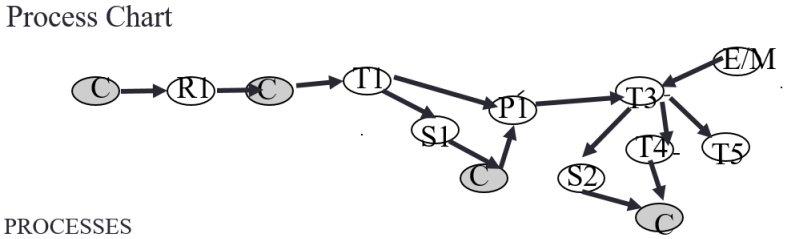
With electronic data interchange (EDI) improving inter-firm transaction efficiencies, suppliers were provided access to a firm's inventory so they could automatically replenish items when they fell below a threshold. While EDI can help speed up the movement of purchase orders and shipping receipts between Domel and its suppliers, they can also allow some of the suppliers to see the inventory levels of products they supply and replenish them quickly w/o a formal purchase order. Again, we will discuss in this manuscript how such an ERP and supply chain interactions are being transformed by today's advanced digitization and increased customer demand for home delivery of certain products.

Since the beginning of 21st century, Internet and Web have extended the value chain into customer and led businesses to track key performance indicators (KPI) such as customer retention and design flaws post shipment. Such customer engagement with a business has evolved rapidly as technologies such as wireless communication, smart phones and social media have started to empower customers to ask for a greater number of services. Businesses are forced to adapt to these evolving customer expectations by transforming their business activities. For example, Figure S2.3 shows how a manufacturing firm has addressed shipment disputes and product complaints using a customer complaint processing system shown below.

Customer Complaint System (CCS): Whenever customers have problems with the product shipped by the firm, they can send a request for rebate or replacement to the firm. Upon receiving such a request, the "customer product complaint form" (CCF) is sent to the customer. This form, upon its completion, is sent to the technical support specialist (TSS) at the corporate headquarters in Syracuse. Upon receiving the CCF, the TSS checks the form for completeness, determines the plant that manufactures the product, and sends the form to the appropriate plant product complaint coordinator (PPCC). At this time, another copy of the form is sent to the

Customer Service Coordinator (CSC) at the corporate headquarters. If necessary, CSC sends the customer a return material authorization number (RMA#) to send a sample product that is defective to appropriate PPCC. Upon receiving the CCF or sample product, the PPCC and TSS works with engineering and manufacturing personnel to diagnose the problem. Based on this diagnosis, a decision (rebate, replacement or no action) is communicated to the customer and rationale is recorded. Decisions on when to make a quick recommendation on a complaint, when to ask the customer to ship the product for examination, when to make a final decision can be left to the technical specialist. Business rules can be constructed based on product type (large vis-à-vis small) and price, as well as customer type (established and loyal customer, regular customer or new customer).

Figure S2.3. Customer Complaint System



PROCESSES

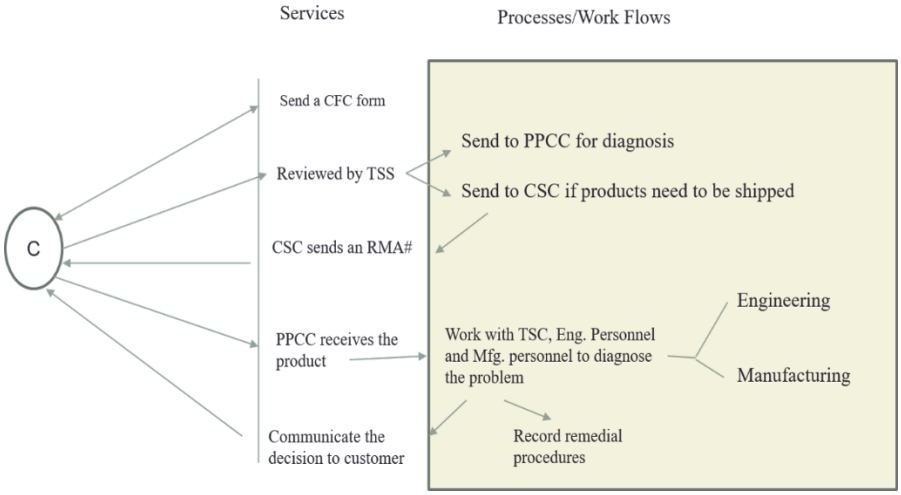
R1 - Receive complaint
T1 - Process CFC (Customer's Formal Complaint)
T2 - Update data base
S1 - Provide RMA #
P1 – Receive/Send info to Technical Support Specialist
T3 - Diagnose the problem
T4 - Send letter to customer
S2 - Provide rebate to customer
T5 - Suggest preventive steps

C: Customer

E/M: Engineering & Manufacturing
T : Technical Support Specialist
S : Customer Service Coordinator

P : Production Plant Coordinator

Customer Service Centric Business Operation Modules



Today, with advanced technologies delivering digital services on-demand via smart phones, customers are demanding services that generate distinct value, and firms are using customer engagement to gain insight into their behavior. Customers are using on-line access not only to purchase products and services, but also to influence the way these products and services are delivered and serviced by the firms using social media. This has forced firms to be agile in the way they address customer complaints.

If you look at various customer service encounters when a customer, in the current system, comes in contacts with the firm, these include what is shown on the left, with the processes-work-flows on the right. Each of these encounters can influence the way customer views the firm for future interactions. As firms develop web or mobile applications to speed up response to customer inquiries regarding product related issues, it is essential that firms transform the way they respond to these customer inquiries based on well-defined metrics in order to ensure that evolving customer expectations are being address. The business operations (processes/work-flows) are modularized around the way they support each service encounter.

Defining innovative customer service that create value is one of the first steps in the customer centric and service driven methodology discussed in this book.

3. Innovative Thinking in a Digital Age

Both researchers and practitioners have emphasized the central role of customers in business strategy. However, developing an innovative digital service to address a customer need has become complex because of both changing customer expectations and an evolving technology landscape. In other words, digital service innovations to support customer needs are influenced by the volatility of customer experience with the service. Customer engagement must be an on-going activity to refine the idea throughout the process, from discovery to post-implementation to sustain both customer interest and the value-delivering potential of the service. The question is: What is the best way for a firm to develop innovative ideas that can add value for a customer?

There are multiple methods used to generate ideas. These vary from "out of the box" thinking to redesigning current processes to reach a set of business goals. In a way, these two approaches may form the opposite sides of a continuum for idea generation (macro to micro-level view or clean-sheet approach to working from a current system). Supplement to this chapter describes some of these approaches. Of course, one can work with customers to generate ideas or analyze service gaps between what is being delivered and what is expected by the customer. An approach that has been gaining some traction is called Systematic Inventive Thinking. It uses a set of templates to generate ideas for organizational consideration. In this chapter, the Kays' art store example discussed in Chapter 1 will be used generate potential ideas. Later, the same templates may be employed to look at a decision process of a business user or a customer, when there is no current system in place.

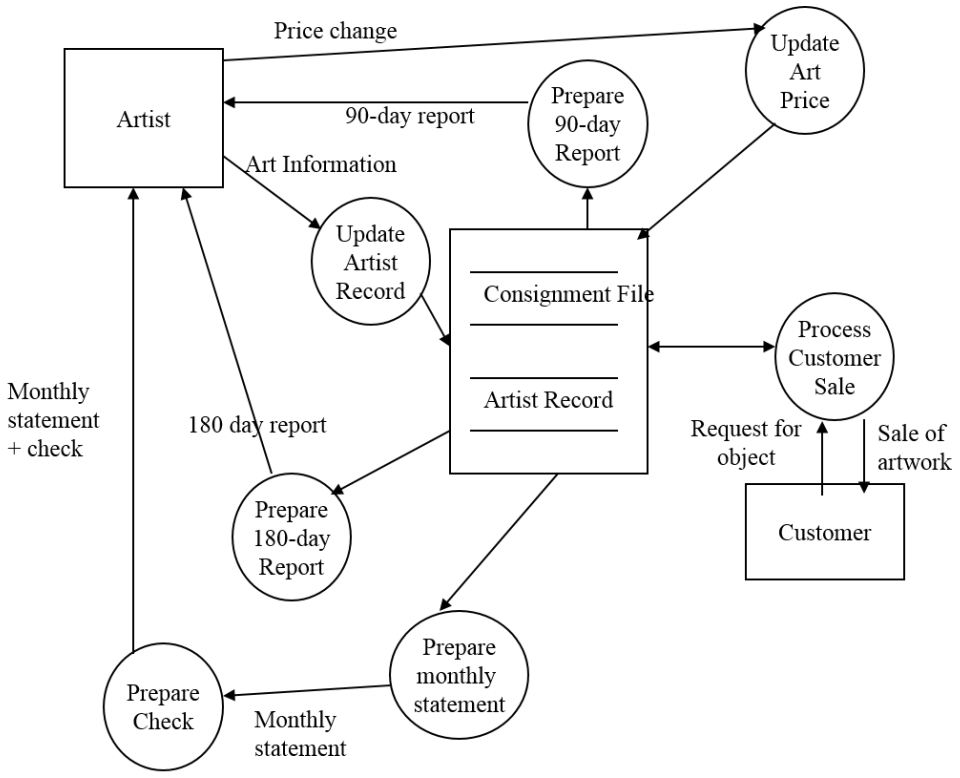
The Systematic Inventive Thinking (SIT) approach [Boyd and Goldenberg, 2013] asks one to challenge current constraints within a system by limiting the focus of one's attention to certain components of that system. This is often called "drawing a box" around certain components (e.g. processes, files, etc.) and focusing one's attention on what is inside the box for changes. For example, a drug store may draw a box around its prescription fulfilling system, an engineering firm may draw a box around its bidding and tool design systems, or a bank may draw a box around its purchasing system. By doing so, the drug store will leave "procure drugs" and "process insurance claims" outside the box, and similarly "parts manufacturing" will be outside the box for the engineering firm. Once a box is drawn around some part of the system, one can generate ideas for changes within the box using a set of standard templates.

The SIT approach suggests isolating some elements within the box that are considered "critical" or cannot be considered for change. For example, in the drug store case, system elements such as prescription requests, payments, pharmacists, and patients are all critical as they all define the business of running a drug store. Similarly, in the case of an art store, artists, artwork, customers, and payments are critical. All other elements, such as who is working (e.g. sales persons and accounting clerks), what they do (e.g. selling and acquiring artwork and reporting), and how they communicate (e.g. product and data files and flows) are candidates for change.

3.1 Illustration of SIT

The standard templates for generating ideas in SIT include: subtraction, multiplication, division, attribute dependency, and task unification. We will use an art store example discussed below (referred to Chapter 1) to illustrate the SIT approach. For this case, the box includes all processes discussed in the case to support the artist and customer.

Kay's Originals is an art store that buys artwork on a contingency basis and sells it to its customers. The company stores art objects provided by an artist, and sells these objects on a contingency basis. The firm keeps the objects in the store for 90 days and, if they are not sold by that time, it sends a 90-day report asking for a decision on revising the price. An artist can either take the object out of the store at that time or reduce the price. If the object is not sold in 180 days, the object is removed from the inventory and the artist is notified in a 180-day report to come and pick up the object. At any given time, an artist can only have 10 objects at the most in the store. At the end of each month, the artist is sent a monthly statement and a check for all the objects sold in that month. The firm keeps 30% of the art price, if the object is sold within 90-days and 40%, if it is sold in over 90 and under 180 days. When an object is brought in or when it is sold to a customer, appropriate files in the firm (artist and consignment files) are updated. The process chart for this case is shown below:



Subtraction

The goal here is a "full" or "partial" subtraction of any element of the system. For example, if we subtract "90 or 180-day status reports," the implication is that the store cannot accurately act on its current policy of changing prices after 90 days or removing artwork after 180 days. It may need to alter some of its policies, such as viewing artwork that comes before the 15th of the month as if it came on the 1st, and artwork that came after the 15th as if it came at the end of the month. Similarly, subtracting the process "revise artist price" may lead to the idea of establishing two prices when the artwork is brought in so that the second price can become effective after 90 days.

Subtraction can also be applied to other elements of the system in the box, such as actors (people performing the task) or data flows. If we remove data in a file, we have to use other data to estimate what is removed. If we remove an actor (e.g. person), we may have to replace it with another actor (e.g. computer) or simply eliminate the process. We can also engage in partial subtraction. For example, partial subtraction of status reports may lead to the concept of eliminating "90 or 180-day reporting" for some artists and not others, based on artist type (new artists vis-à-vis established artists), or based on artwork type (new vis-à-vis well known). This leads to the next template: multiplication.

Multiplication

This template calls for "replicating instances" of current operations and changing these operational instances for different inputs (types of artwork or artist types) or output (customer types). The art processing cycle (acquiring, reporting, and payment processes) may be different for different types of artists. By classifying artists as new, established, or well known, we might alter the art processing cycle for each segment. For example, well known artists may bring artwork and get paid when the artwork is sold, and new artists may only keep the artwork for a certain number of days and pick up their artwork at the end or collect payment (if it is sold). Similarly, artwork may be sold to different customer types (new, regular, or high value), and artwork itself may be categorized as new, established, or "premium." Each combination of artists, customers, and artwork can lead to multiple operational instances that can be structured differently, and this leads to the next template: division.

Division

The division template seeks to divide the operational sequence into multiple sub-tasks (or modules) so that they can be re-ordered to address the needs of different customer types or markets. For example, the operational sequence of art processing includes: accept artwork, establish price, prepare 90-day report, revise art price, prepare 180-day report, and prepare monthly statement/check. Here, "revise art price" may be reordered so that it is done when the object was accepted for all regular artwork and established artists, possibly based on historical trends in art sales. It even can be removed altogether for some premium artwork or well-known artists. For new artists, it may be subtracted by having the art price reduced automatically by the art store after 90 days by a standard percentage without artist intervention.

Another type of division is when a task or sub-task is complex, such as "establish price." This task can be divided into sub tasks such as determine features, establish uniqueness, review historical sales data, and set price. Also, the task can be divided based on other attributes such as "date art objects were brought in" (e.g. summer, fall, etc.) and the nature of the art object (e.g. contemporary, religious, winter, or summer landscape), and the price is established accordingly for the incoming artwork. Moreover, by categorizing the artwork as simple, established, or complex, different approaches may be used to establish a price. Examples here include standard price set with no changes, artist establishes price and adjustments are made based on prior history, or artist defines price with no changes, respectively. This, in turn, leads to the application of the next template: attribute dependency.

Attribute dependency

Attribute dependency recognizes that the process steps performed may depend on attributes such as the type of artwork sold, the customer segment buying the object, the length of time the artwork was in the store, etc. Different tasks in an operational sequence may be used for each

attribute (e.g. subtract 90-180-day status reports, subtract change price, etc.). The segmentation discussed earlier can also help inform how various sub-tasks in each art processing cycle may be configured to address the needs of each market segment.

The dynamics of the marketplace today call for agility in the way task modules within each processing cycle can be re-configured to stay competitive. For example, "well-known" artists may interact with "high valued" customers directly on artwork because of their long-standing relationship with the art store. Similarly, the art store may eliminate all reports other than a monthly statement/check for established artists and allow them to change the price and pick up artwork when they consider it appropriate. The last two examples lead to the last template: task unification.

Task Unification

By having a well-known artist's work remain at the artist's home for high valued customers to see, and allowing established artists to make price changes when they consider it appropriate, the art store is delegating these tasks or processes to the artist (i.e. unifying task modules with an external stakeholder or sourcing it to them). Such task unification can extend to possibly having the customers pay the artist directly and have the artist in turn provide the art store a "connection fee." Similarly, the customer can select an artwork and pay the artist directly with a small consignment fee to the art store, thus eliminating the need for the art store to send a monthly check to the artist. In other words, by unifying current processes with either artists or customers based on the segments of the market the art store serves, the art store can improve the its effectiveness and efficiency, as well as differentiate itself in the marketplace.

In summary, the ideas that surfaced through the application of various templates should be evaluated for their technical or commercial viability. The important goal of the SIT approach is for a firm to differentiate itself in the marketplace by configuring its task modules to gain customer loyalty, enhance revenue streams for distinct services, and improve customer satisfaction.

While "subtraction" and "task unification" have parallels in the process redesign literature of the 1990s (referred to then as "task elimination" and "task distribution"), the primary difference between process redesign and SIT templates lies in the goals they support. In the 90s, the goal was optimal resource utilization and lean management. The goal in the 2010s is to build agility in business operations to support mass customization and enhance customer-centric and service-based differentiation. In some cases, lean management and agility of business operations are both needed, i.e. build agile and configurable modules that use resources efficiently and are effective in delivering value.

3.2 SIT when there is no current system or customer decision process

The discussion thus far has applied the SIT template to a current system already in place and showed how an organization can segment its customers, subtract processes/work-flows to simplify operations to enhance customer service, and empower customers by allowing them to perform service order and fulfillment tasks (task unification). The same SIT templates can be used to generate ideas when there is no current system by simply imagining a customer's decision process and seeing what ideas surface when these templates are applied. For example, imagine that you are a potential customer (or even talk to some of them) and document the process leading up to your decision to purchase a product or service. This is often referred to as understanding a customer's decision journey. Some examples include a customer going to a grocery store to buy

food, going to pharmacy to get prescription drugs, deciding on juggling kids' after-school schedule among various activities, etc.

Start applying SIT templates to see what type of innovations, supported by digitization, can lead to improved service. Over the last few years, we had several students come up with ideas that can relate implicitly to an application of SIT templates. Some are discussed below:

- Subtract payment process each time a senior goes to drug store: Pre-pay or implement automatic transfers at periodic intervals from a bank account
- Subtract listing items to purchase before you go to a grocery store: Download what has been ordered in the past and allow customers to update it. A more digitally involved app includes sensors that check items in the refrigerator and automatically lists items that are low in quantity or expiring because of due dates;
- Multiplication: Segment senior citizen activities along health, entertainment, social, and home chores, and use alerts from various apps to help them manage these tasks;
- Attribute dependency: Use traffic and weather conditions, children priorities on after-school activities, etc., to select the best way to transport them using two working parents;
- Task unification: Have shops automatically alert customers with a list of household needs they purchase regularly (toilet paper, paper towels, detergents, baby diapers, etc.), and ship these directly to the home after the customer updates this list.

The goal in this chapter is to surface innovative customer service ideas, supported through a new product or service, so an organization or entrepreneur can start to explore their viability. The next section will further elaborate on how to structure these service encounters.

Supplement to Chapter 3

Innovation Approaches

Firms have used "out of box' thinking to generate ideas in new product development for several decades and many of these have relied on consumer survey/feedbacks, macro-economic and competitor data, among others. Group decision support tools are often used to seek input from multiple stakeholders, including suppliers and customers, to reach decisions on new market opportunities. Out of box thinking seeks to not only broaden stakeholders providing input, but also expand their horizon and have them consider knowledge and insights from external environment and micro and macro-economic trends. The goal is to reduce disciplinary or historical bias and develop novel solutions to problems that may not be apparent to those view solutions within a current context. Designing "product packaging" that is attractive to customers first and then let that lead to the design of the product is an example of such out of box thinking.

Increased use of social media and other technologies by consumers in purchasing a product and providing reviews for all to see is changing a firm's thinking on how best to remain proactive and customer centric in the way products are designed and serviced. Such a consumer oriented thinking, also referred to as design thinking, is making firms to realign number of their business operations to address customer needs. Tim Brown, CEO and president of IDEO, defines design thinking as "matching people's needs with what is technologically feasible and viable as a business

strategy. Such a thinking is to combine empathy for the context of a problem and creativity in the way solutions are generated for rational analysis. This calls for divergence in idea generation and convergence towards a set of feasible solutions, with convergent and divergent thinking often occurring in parallel.

While design thinking is viewed a new form of solution-focused thinking to reach a goal – an ideal or better future, the iterative process implicit in design thinking is has been a part of problem solving strategies discussed by Hermon Simon. The stages identified include define, research, ideate, prototype, choose, implement and learn. The "idea generation" includes stages such as define, research and ideate, and "technical and commercial viability" are established by prototyping to choose and implement a solution to learn. Depending on what is learnt from the prototype, one can either proceed towards implementation or iterate back to repeat the idea generation step. The concept of developing a prototype for assessing its viability widely practiced in engineering literature.

However, pilot testing a business idea to assess its viability is a bit more challenging. Firms in the 90's have sought radical shifts in business performance through innovative process redesign ideas. Ideas for such radical shifts came from either using a clean sheet approach (this is similar to out of box thinking) or bench-marking against "best practices" of other successful firms. Some of the best practices looked for "process sequence or work-flow patterns" that have shown significant gain performance metrics, often using information technologies. These ideas, radical or incremental, called for organizational resource adaptations to enhance the current business model and performance metrics, and not to alter the business strategy – cost or value based differentiation.

However, service innovation ideas generated today are derived from customer engagement and are often context driven. While they are coming from important stakeholders, they have two characteristics (reaction speed and narrow in scope) unlike idea generations of the past. Firms need to react quickly, as lack of perceived business response may be viewed as insensitive to customer expectations. They also tend to be narrower in focus, context specific and volatile, i.e. value perceived can change rapidly based on what is offered by others in the digital market place. This is one of the complexities of social media marketing as well as brand or reputation management. Firms need to respond quickly with some form or customization or newly added complementary services, while evaluating their impact on the firm's market, current or new, business strategy, as well as its organizational capacity (internal and external resource mix) to support such a strategy. Evaluation of these ideas done at a faster speed, if accepted can be small (e.g. a minor adjustment in resources in support of current business strategy) or large (e.g. a major shift in resource deployment and/or the business strategy).

While not all ideas lead to dramatic shifts in the way future services are delivered using advanced digitization (e.g. Uber for transportation and AirBnB for short term accommodation), customers engaged in value co-creation can provide ideas for new service offerings, some complementary add-ons to current services, and others enriched by deepening customer experience. For example, a customer purchasing food products for personal consumption may look for complementary services (e.g. purchase of food for pets or healthy products), or enriched services (e.g. information to support purchase decisions, use of food in unique recipes or for

serving those with dietary restrictions). The key again is the need for an entrepreneurial mindset within a firm to support faster evaluation of ideas for viability.

An innovation approach, called Systematic Inventive Thinking (SIT) has been proposed to help with idea generation within a given context. The goal here is to draw a "box" around specific problem context and let stakeholders use any number of standard templates: subtraction, multiplication, division, attribute dependency, and task unification to challenge the assumptions made within this context. If the box is drawn around a system, any elements of this system (processes, work-flows, resources used, etc.) can be changed as a possible idea and assess its impact. If the box is drawn around an entire business and its environment it may be akin to "out of box" thinking, and if the box is narrowly drawn around a business operation it can lead to process redesign or lean management ideas. If the box is drawn around a "customer service experience" that is under investigation, it can potentially lead to complementary or enriching service ideas for possible evaluation. Since service innovations today are often IT-enabled (digital) services), these ideas can possibly leverage advanced digitization opportunities to new business models by expanding the firm's reach into the customer eco-system and even transform a business by changing its competitive strategy.

4. Services

In the previous chapter on innovation, Systematic Inventive Thinking (SIT) was used to generate innovative ideas to solve a perceived customer need and generate distinct value. With any of these approaches, the goal eventually is to translate innovative ideas into business solutions that can be operationalized.

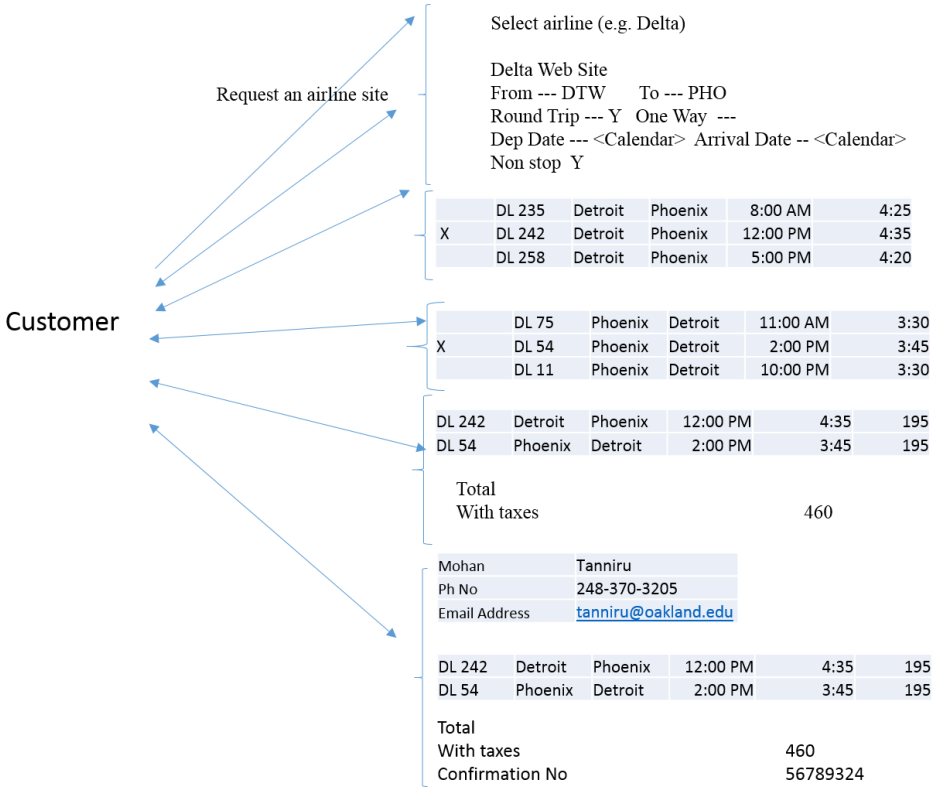
Independent of how the innovative solution is generated to address a customer need, one of the key objectives of the digital leadership methodology is to translate this solution into a "service request," so that a firm can establish specific service goals to meet customer expectations. In other words, each customer need is viewed as a "service request" and addressed by the firm using several customer interactions. For example, a customer service request "to purchase a product" may include several customer interactions such as "get product inquiry, provide information requested, accept an order, answer any questions on the order delivery, deliver product, and collect payment." Each of these customer interactions (also referred to as service encounters), if not met with an appropriate response by an organization, can lead to customer dissatisfaction or negatively impact customer retention. For these reasons, each interaction associated with service requests is measured and evaluated to ensure that the firm is meeting its service goals. In the Digital Leadership Framework, this calls for moving from Step 1 (Innovation) to Step 2 (Service/Metrics).

Understanding customer expectations at each encounter is critical to the development of any digital service (or App) that meets the overall service goal (i.e. complete the sale). For example, we all make reservations for air travel. See Figure 4.1

The first service encounter here is to when a customer uses a browser and searches for the web site of a particular airline (e.g. Delta) or a travel intermediary (e.g. Travelocity).

- This first service encounter leads the provider to show possibly a form that asks the customer to select the "from" and "to" cities, date of departure and return; and other options (round trip or one way; yes or not to "not stop", etc.). One can view customer request (by selecting a site) and provider's response (by providing a firm for the customer to fill) can be viewed as one "module" of the overall service goal (i.e. complete a reservation) or a micro-service.
- Once a customer completes the form and submits it, the second service encounter was initiated. This calls on the provider to come back with options for "departure." This completes the second service encounter and becomes the second service module.
- After customer selects options for departure, the provider comes back with options for "arrival," leading to the completion of the third service encounter (making this the third service module or third micro-service.
- Once this information is provided, the provider comes up with price and other travel options (fourth service module). Once customer completes this information, the provider comes up with a web page that asks for name, address and billing information (fifth service module).
- As you can see, a service module or micro-service is one back and forth interaction between the customer and the service provider. Ultimately, all these service modules have to be completed before the provider can say that the goal is achieved, i.e. customer purchased a ticket or the airline or intermediary sold the ticket.

Figure 4.1 Airline Service Encounters



Now, we have divided this back and forth communication as distinctly separate service modules or micro-services, but they can be grouped into bigger service modules to minimize complexity. For example, the same set of encounters can be grouped into three major modules: get travel information from customer; get approval for price/travel options; and get billing information. In other words, the level of granularity of these service modules can vary depending on how a customer behaves through the process. For example may continue interaction until you give price/travel options before deciding either to continue or not. Once all the options are provided and the total cost is provided to the customer, a customer can still walkaway before providing any billing information.

Each of these crucial decisions points are important for the provider to track as they may inform on the criteria customer is using to either proceed or not proceed. These critical points can also be useful to develop metrics to measure provider performance: are the travel times satisfactory to the customer? Are the price and options leading to total cost meeting customer's economic needs? If a customer walks away w/o purchasing the ticket, information on why or how many customers walked away at each of these intermediate decision points can be insightful and this is one of the goals of business intelligence. It is not just knowing who purchased the ticket and when, but who didn't purchased the ticket and why not? So, thinking carefully about structuring the service encounters and developing metrics for each service module (or micro-service) is useful to not useful to make sure customer moves from one module to the other in order to complete the overall service goal, but also to help the providers understand the customer behavior when the goals are not met.

So, one of the first objectives of a firm that wants to be "service driven" is to identify the sequence of service encounters that will lead customers towards making their decision. In today's competitive environment, even organizations that produce products (e.g. automobiles or durable goods) are asked to act like service providers. For example, a customer service request related to the purchase of a car may include several customer interactions or service encounters between the automobile dealer and customer. Some of these encounters are used to provide product information, accept an interest in the purchase of a vehicle, address inquiries related to the customer's financing options, complete the delivery of the vehicle, and completing the financing details before handing over the vehicle. Each of these service encounters is a touchpoint between service providers and the customer and, if not handled properly, can lead to customer dissatisfaction and potentially walking away from the deal.

The service encounters discussed in Figure 4.1 are between a customer and a travel provider (airline or an intermediary). But, service centric approach to meeting customer needs is not restricted to only external customers. In fact, organizations that are service driven should view each subunit within the organization both as a service provider and service requester. For example, the order processing department places a service request (e.g. validate the customer order) to the credit department (the service provider). This service request is performed by the credit department either by using its internal processes (e.g. checking the order information using customer credit file and order value), or sending the request to an external supplier/partner (e.g. a credit agency) or to another department (accounts receivable for payment history).

Fulfilling each service encounter as well as overall service itself as an inter-dependent interaction of multiple service units within the provider firm can help support agility in business operations. For example, if the provider decides to segment customers and decides to offer a mix and match of service modules for unique differentiation, then the internal service units have to be flexible to support such market segmentation. For example, if the automotive dealer to segment his customers are those who are purchasing a vehicle with cash, those who are seeking financing by the automobile company, those who are commercial customers that buy frequently or in bulk at times, the dealer and automobile firm may want to have various internal units operate with flexibility to address the appropriate servicing needs of these customers. In other words, building flexibility to evolve with changing customer expectations or potential market segmentations using a mix of service modules means that there should be flexibility with the way internal business processes and work-flows have to be structured around and across each of these service modules. This will be addressed in further detail in the next chapter. The rest of the chapter uses the Kay's art store example to develop service encounters for customers who may visit the store to purchase art work. Note that the current system discussed in earlier chapters viewed the art store operations from the artist view point.

4.1 Generating service encounters

Let us refer to the Kay's art store. The current system, as shown in Table 4.1, shows one service encounter used to purchase artwork in the store. For example, a customer wants to buy a piece of artwork, and you are trying to provide service to this customer. Even if the overall service goal is for you to provide an art object that the customer wants, this is not going to happen in one simple transaction: the customer asking for the object and you providing it and collecting money. This may happen only if the customer simply sees a display and selects an art work and pays for

it. Often the sale may only happen after several customer interactions. For example, in a "brick-and-mortar" operation, a customer walks into a store and the art store's personnel engages in several service encounters as follows:

1. Show the artwork
2. Provide price and artist information
3. Accept an order for the artwork
4. Sell the artwork
5. Collect money from the customer

Table 4.1: Defining Service Encounters

Customer Order Fulfillment	
	Sell artwork
Purchasing art work from artist	
	Collect artwork
	Notify art sale status
	Change art price
	Provide monthly payment
	Provide payment for the product
	Send unsold art work

Even a single service encounter, "show the artwork," may include several other related customer interactions or encounters:

1. Greet the customer
2. Ask them if they need assistance
3. Ask them some questions about what type of artwork they are looking for, what purpose (e.g. display or gift), what artist if any they have in mind, where it will be displayed, etc.
4. Suggest some artwork for them to browse on their own if they prefer, or show artwork if they prefer more personal engagement, etc.

Each of these encounters reflects how you respond to a customer's questions, and how you use these encounters to seek and provide information to answer these questions. By interacting with a customer in a store, you have an ability to find out why a customer wants to buy artwork and what they are looking for. For example, a customer buying a new home or a customer that just got married may be looking to decorate their house with artwork. You can use informal customer interactions to decide how you will respond to these service encounters. However, in a virtual environment, such give and take with the customer is much harder, and you have to think ahead about the customer decision-making process to anticipate the type of encounters you need to plan for and design the system to support such interactions. What are they looking for and why? What are some of the criteria before they make a decision to purchase an artwork?

4.2 Service Encounters for different customer segments:

As discussed in the previous chapter, SIT templates may help you segment the customers into loyal/high value customers, established customers, and new customers, and allow you to even segment artists into well-known artists, regular artists, and new artists. If so, the encounters with each customer may be different, this calls for flexibility in the way you support each of these customer segments. For example, service encounters may be different for established, loyal, and new customers as shown below.

Service Encounters with Established Customers

- ES1 Inform them when artwork comes from regular artists.
- ES2 Invite them to the art store for special shows when artwork comes from new artists
- ES3 Invite them to special showings of well-known artists
- ES4 Invite them to bid on certain artwork, with the option to buy if their bid is the highest
- ES5 Allow them to pay using pre-paid accounts or using an established credit line

Service Encounters for Loyal Customers

- LS1 Invite them to special showings of well-known artists
- LS2 Invite them to bid on certain artwork, with the option to buy if their bid is the highest
- LS3 Allow them to pay using pre-paid accounts or using an established credit line

Service Encounters for New Customers

- NS1 Invite them to the art store for special shows when artwork comes from new or well-known artists
- NS2 Allow them to pay using cash or credit card

4.3 Service Metrics

All service encounters with external stakeholders (e.g. customers or suppliers) or internal stakeholders have metrics associated with them. These metrics are used to ensure that the firm meets stakeholder expectations. These metrics also help guide the organization in allocating its internal resources to fulfill these services. Some of the metrics associated with the art purchasing service are shown below:

1. Show the artwork	Viewing comfort and convenience
2. Provide price and artist information	Timely communication of art information
3. Accept an order for the artwork	Ease of order-taking service
4. Sell the artwork	Time to get the artwork to the customer
5. Collect money from the customer	Ease of payment process and options

To the extent possible, the metrics for each service encounter as well as the overall service goal should be measurable either on an objective scale (using quantitative data) or subjective scale (using qualitative data such as customer satisfaction). The service encounters start when stakeholders initiate their intent to engage in a business transaction. When the service encounters are initiated using virtual communication (via the Internet as is typical in today's business environments or using a mobile app), then the metrics identified must reflect this type of communication.

Next chapter will look at processes and work-flows designed to fulfill various service encounters. The rest of the chapter discusses some sample problems, where you are asked to separate encounters from the processes/work-flows of an existing system, and establish some metrics to assess organizational performance.

Culver's is a regional company

Customers can range from walk-in customers, commercial organizations, and major construction firms. When a request comes in, an order is prepared and sent to credit department for approval. If an order is rejected, the customer is notified. If the credit is approved, the sales order is sent to the inventory clerk. The inventory clerk checks inventory, and places a back order for products that are not in the inventory. Customer is provided an estimate on when the carpet/rug etc. will be installed. If customer accepts the installation time, the order is sent to the warehouse. Warehouse personnel use existing inventory to make the cuts of the carpets or rugs according to the specification in the sales order. If some items are backordered, warehouse personnel will wait for these items to come into the warehouse before cuts are made. Once the order is cut for installation, the installers call the customer to set up a schedule for installation, and install the carpets.

Below is a set of customer service encounters of Culver with its customers, with processes/work flows associated with each of these service encounters.

Accept request

Prepare order

Check credit

Send to inventory clerk, if approved

Send to customer if rejected

Check carpet/rug inventory

Place a back order if items not in inventory

Inform customer on estimated time to ship or install carpet/rug

Customer accepts installation time

Send order to Warehouse

Cut carpets or rugs using existing inventory

Wait for orders that have back order items

Cut once these items come in

Check customer on installation time

Install the carpets.

Required

What are some of the service metrics on which Culver can evaluate its performance?

Poly U Communications

Customers come into the store with a request for finishing operations such as folding, cutting, padding, and binding of paper material. In addition, they may request photocopying, offset printing, and class notes service.

Using the price list for different paper samples, an order form is prepared and a job number is assigned to this order. One copy of this form is given to the customer and the other two copies are filed in the job-processing file.

A clerk periodically checks the jobs on the scheduling board and, if there is room on machines, transfers the orders from the processing file to the scheduling board. The other copy of the order is sent with the job if Poly U cannot complete the job on its premises and has to subcontract it.

After the order goes through various processing stages, the job on the scheduling board is updated accordingly. Once the job is completed, it is transferred to the billing unit for preparing an invoice.

When a customer comes to the store to pick up the job a copy of the invoice is given to the customer. After the customer pays the invoice amount, the second copy of the invoice is filed along with the cash in a cash receipt file.

Required

Identify the service encounters and metrics to support Poly U Customers.

Federal Supply Corporation (FSC)

FSC manufactures custom-made metal and plastic parts and components, i.e. all parts and components are made only on receipt of a purchase order from the customers. When the required parts have been completed, they are immediately shipped to the customer. Approximately 75,000 customer purchase orders are processed by the company each year. A typical purchase order contains on an average request for five different items, in quantities from 12 to 1000 each.

When customer orders are received, an entry is made in a transaction log book. The order is sent to the credit office for credit verification.

If the credit is not approved, the customer order is returned to the customer along with a letter indicating the reason for disapproval. If the credit is approved, the order entry clerk prepares a work order and sent to the manufacturing department. Upon receiving the finished goods from the manufacturing along with the work order, a customer packing slip are prepared.

The packing slip is sent to the customer along with the shipment. When the customer payment is received, it is sent to the credit office to update the customer credit file.

Required:

Identify the customer service encounters and associated metrics.

JONES Company

The Jones Company sells its products to walk-in customers who pay cash, as well as large customers (e.g. commercial organizations) on credit.

Credit customers send a purchase order to Jones Company. The purchase order and a product catalog are used to prepare an invoice. The invoice is sent to the shipping department. A copy of the invoice is sent to the customer and the department fills the order and ship the products to the customers.

Cash customers walk into the store and order items. They receive a sales slip and the other copy is given to the order-filling clerk. The order-filling clerk selects the products listed in the sales slip from the store, enters on the price of the product, and sends these products with the sales slip to the cashier. The cashier verifies the price and computes the sales value. When customers bring their sales slip to the cashier, the cashier collects the money and returns the goods to the customer.

Required:

Identify the customer service encounters and associated metrics.

5: Services to Process/Work-Flows

Once the innovative solution is translated into several service encounters, all helping fulfill the primary service goal, the next step is to operationalize each of these service encounters through processes and work-flows. In this chapter, we will focus on converting service encounters into processes/work-flows using three different examples. Before we discuss this conversion, let us first discuss the difference between a service and a process.

Service vis-à-vis Process

A service is defined as an encounter between the unit under study (firm or a department) and its external stakeholder (customer, supplier, or other departments). These services are measurable and provide opportunities for improvement, and they can be reconfigured differently to meet the varying needs of stakeholders. For example, a service encounter between an art store and an artist to "establish price" can be eliminated when the store interacts with well-known artists, but not when it interacts with new artists. Similarly, a service encounter between an art store and a customer to "pay for artwork" may be eliminated for loyal customers when customer pays the artist directly. For others, store collects payment from customers and pays the artist in turn.

Processes are business activities or tasks that are performed and the work-flows that connect these activities to fulfill the request associated with each service encounter. At a granular level, even activity can also be viewed as a service performed to support the activity that precedes it. However, for discussion here, we define service encounters only when the unit under study is interacting with stakeholders external to the unit (e.g. external customers or internal customers). The service encounters with suppliers or partners (including other business departments) are viewed as processes, even though suppliers/partners may view these interactions as "service encounters: from their viewpoint.

As discussed earlier, each service encounter or collection of them to fulfill a major service need can be viewed as a service module or micro-service. To complete this service module, a business has to perform some internal activities, access data, possibly interact with external suppliers or partners for information, etc. before a response can be provided to the customer seeking this service. For example, a service module called "product inquiry" may include customer asking for information about a product (its characteristics, price, delivery date, etc.) and the business providing it. Another service module "place an order" may include a customer placing an order for a number of products for delivery at a given time.

Each of these service modules or micro-services may include a back and forth between the customer and the provider or simply a single exchange, depending on the complexity of processes and work-flows needed to fulfill this service request. For example, "product inquiry" service module may include a two service encounters" customers requesting the information and providing searching the appropriate files and retrieving the information to provide an answer to the question. On the other hand, the service module "place an order" may be complex and can include several sub-tasks, such as: 1) Check the availability of the products in the inventory; 2) Call the customer back to find out if customer likes to place a back order, if the products are not in stock; 3) Inform the customer the potential delivery date of backorders and check it is acceptable or customer want to change the order; and 4) Make adjustments to the order or completes the partial and backorder. In other words, this module may involve many service encounters between the provider and the customer.

While there is no magic formulae on how all the service interactions with the customer are grouped into service modules. It is a reflection of the complexity involved in fulfilling the service encounters to the satisfaction of the customers. Fulfilling each service module should meet some key customer goal, so they cumulatively can lead to the completion of the overall service goal. It also should allow the service provider to evaluate how effective and flexible the provider organization is in meeting these goals. For example, the metric to service module "product inquiry" is how quickly the provider can get access to the information and communicate it to the customer. This may call for flexibility and easy access to all the needed files that have this information. On the other hand, the metric for service module "place the order" may call for effectiveness among multiple units within the provider organization: warehouse to communicate inventory levels, access to manufacturing or purchasing group to know when backorder can be fulfilled, etc. So, the back operation flexibility and communication among these units is critical if the metric used for service module "place the order" (respond within certain time") is to be realized.

The rest of the chapter will illustrate different examples of service encounters and the back-end processes and work-flows needed to support these service encounters.

5.1 Kays Originals

Let us refer to the art store discussed in Chapter 4. In that chapter, we identified service encounters for three different types of customer segments: established customers, loyal customers, and new customers. In the diagrams 5.1 and 5.3 below, we will show how these service encounters are supported using specific processes/work-flows so that the service goals can be met. Note that the processes shown here are high level activities (e.g. invite established customers to art shows of well-known artists). At a later stage, this *high-level activity* may be further subdivided into several *lower level* activities (e.g. get the name and contact information of all established customers, find the dates when well-known artists are showing their artwork, send email or other types of alerts to established customers regarding these shows, seek feedback from those customers who attended the shows, etc.). But, for now, we will leave these processes as a higher level.

Note that the processes associated with the service encounters may overlap, i.e. the same high-level processes may be used to support several customer segments. This is in fact a characteristic of customer segmentation. Each segment need not use completely different processes. Existing processes can be reconfigured to support different customer segments. In total, the three major customer segments of the art store can be supported by a total of nine major processes. Figure 5.4 shows another way to representing the processes in a decision tree.

Figure 5.1 Established customer service encounter to process/work-flows

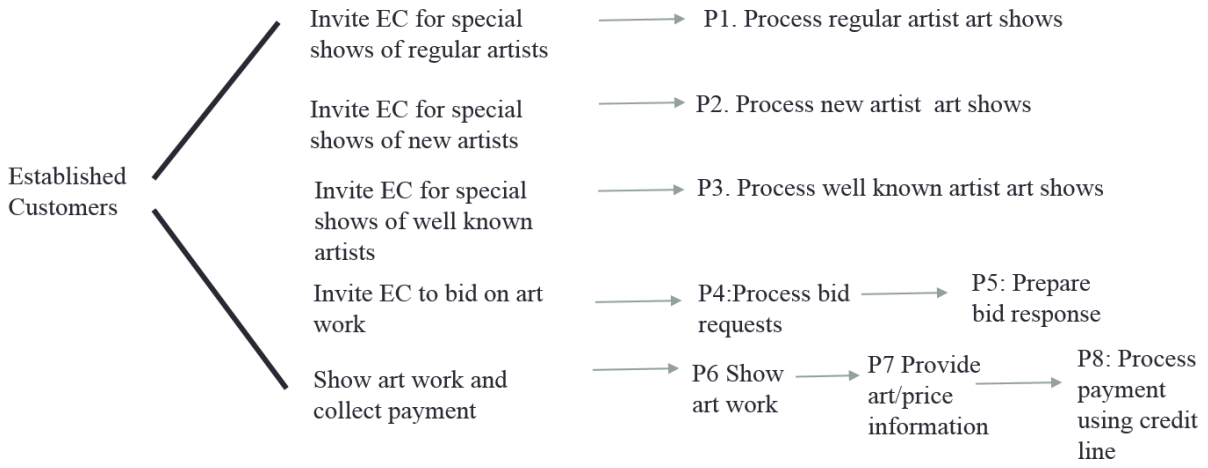


Figure 5.2 Loyal customer service encounter to process/work-flows

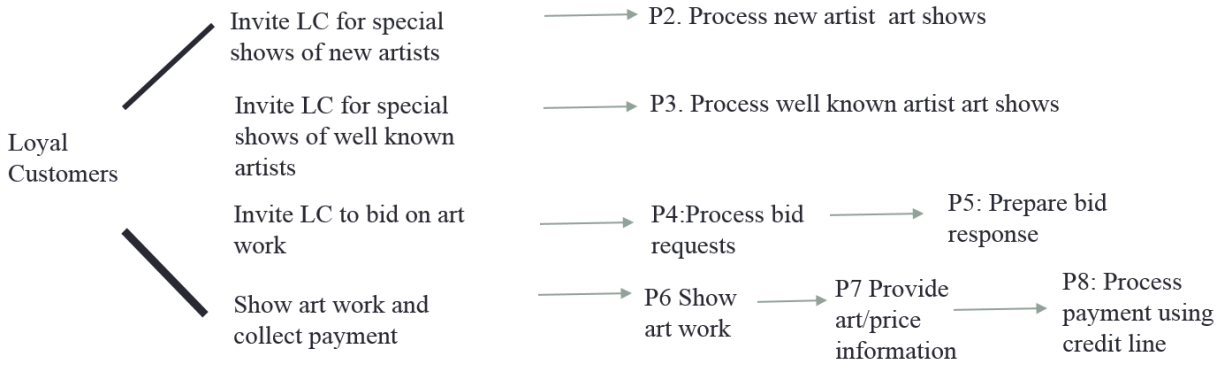


Figure 5.3 New customer service encounter to process/work-flows

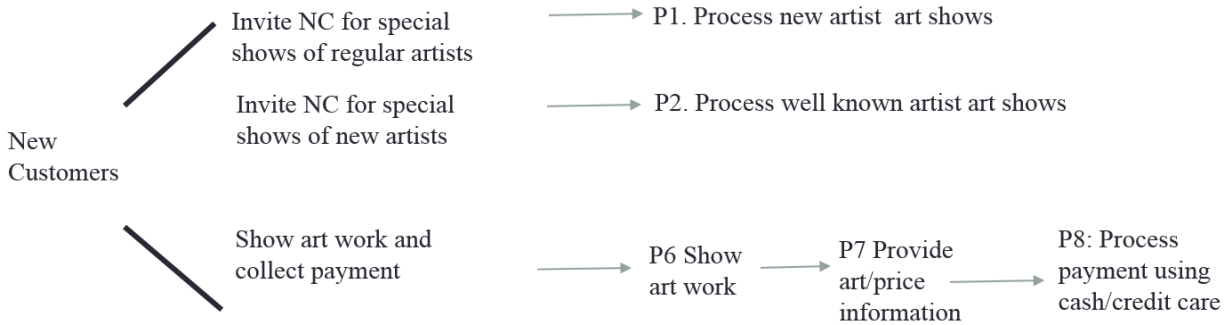
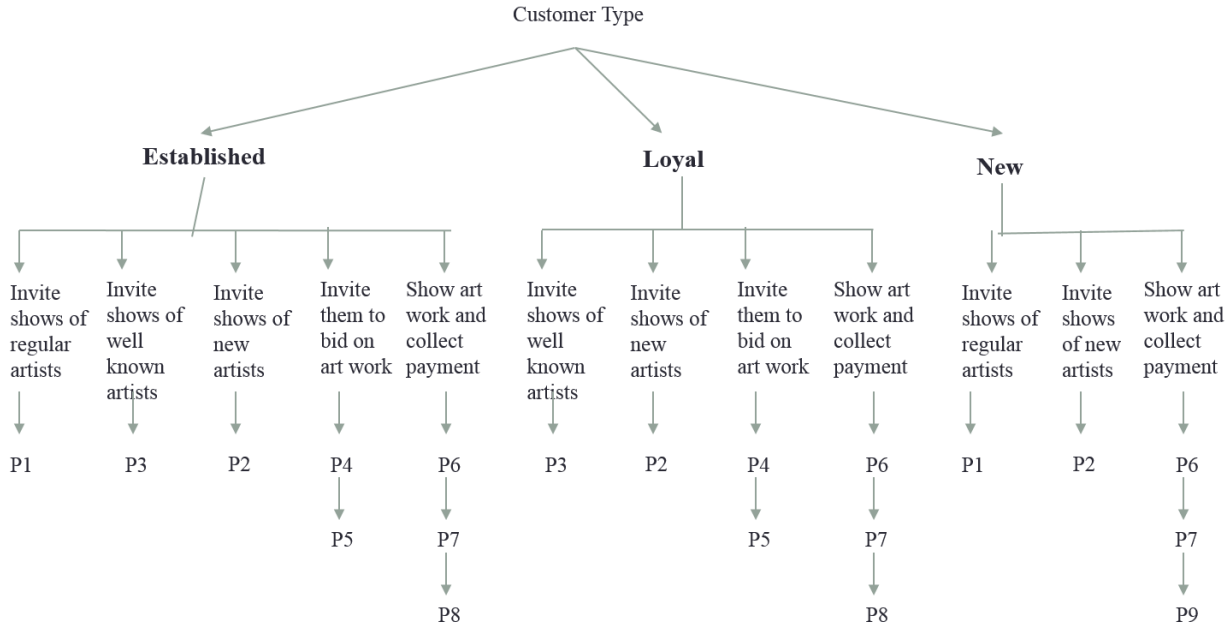


Figure 5.4 A Decision Tree Representation of Process and Work Flows



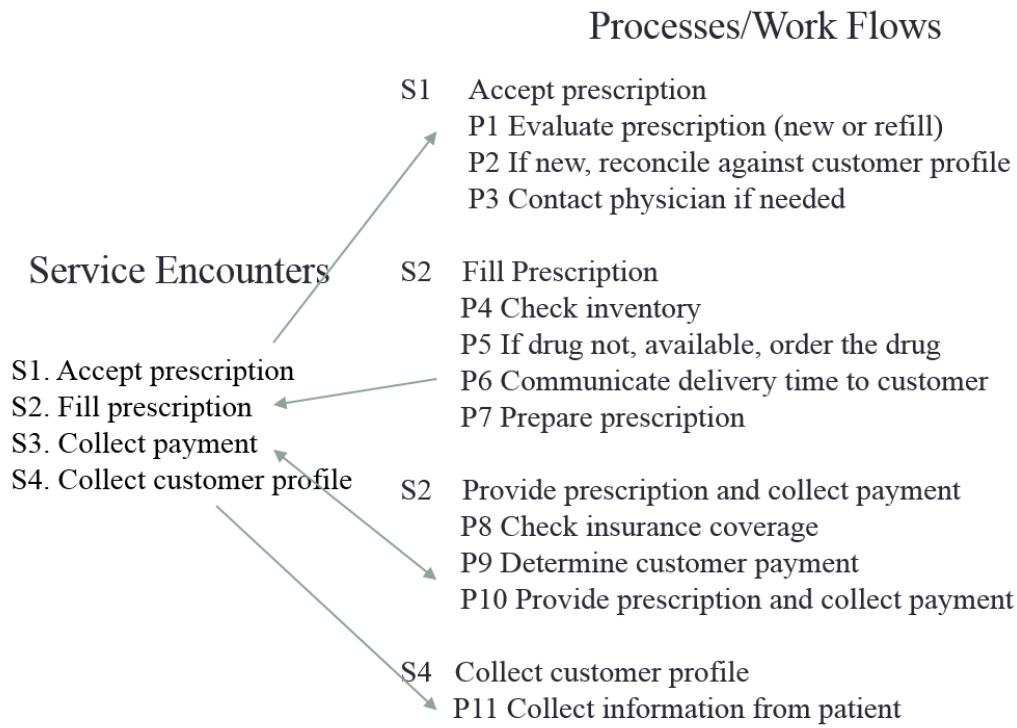
5.2 Drug Store

The drug store wants to develop a service innovation for its senior customers (i.e. customers over 65) so that they do not have to come to the store to pick up drugs. The drug store has the following three service encounters: accept a customer prescription, fill the prescription, and collect payment if insurance does not cover the entire cost. Of course, if the customer is new, the drug store may use another service encounter to complete customer profile with information such as prescription history, allergies, medical history, and insurance information. These service encounters are listed below:

- Accept prescription
- Fill prescription
- Collect payment
- Collect customer profile

Each of these service encounters may use several specific processes. See Figure 5.5. For example, the specific processes used for "accept prescription" may include: evaluate prescription (new or refill), reconcile it with customer profile (to see if there are any drug interactions with the current prescriptions that the patient is taking), and contact the physician (if needed).

Figure 5.5 Digitization Options for Pharmacy



Similarly, "fill prescription" may include checking inventory to see if the drug is available, ordering it if needed from the pharmacy warehouse, communicating to the customer on when the prescription will be available, and providing the prescription. "Collect payment" may include checking insurance coverage on what is covered, determining what the customer owes for the prescription, and collecting the remainder of the payment. "Collect customer profile" may include getting medical history either from the customer or from the physician.

Another way to represent the processes and work flows is the use of a flow chart, as shown in Figure 5.6, The next case service to process/work-flow mapping for the patient room robot case is illustrated next.

5.3 Patient Room Robot

This case illustrates a select set of services a patient room robot performs in a hospital's patient room. These are shown in Figure 5.7.

1. Patient services: Supporting toileting or entertainment needs of patients is key to patient satisfaction.
2. Food service: Ordering the "right" food for a patient based on their diagnosis is critical to avoid health risks
3. Pain medication: Considered key to a patient's length of stay in the hospital and their satisfaction
4. Lab visits: Visiting the lab is key to ensure the patient is properly tested and prepared for effective treatment

Fig 5.6 A Flow Chart of Prescription Services

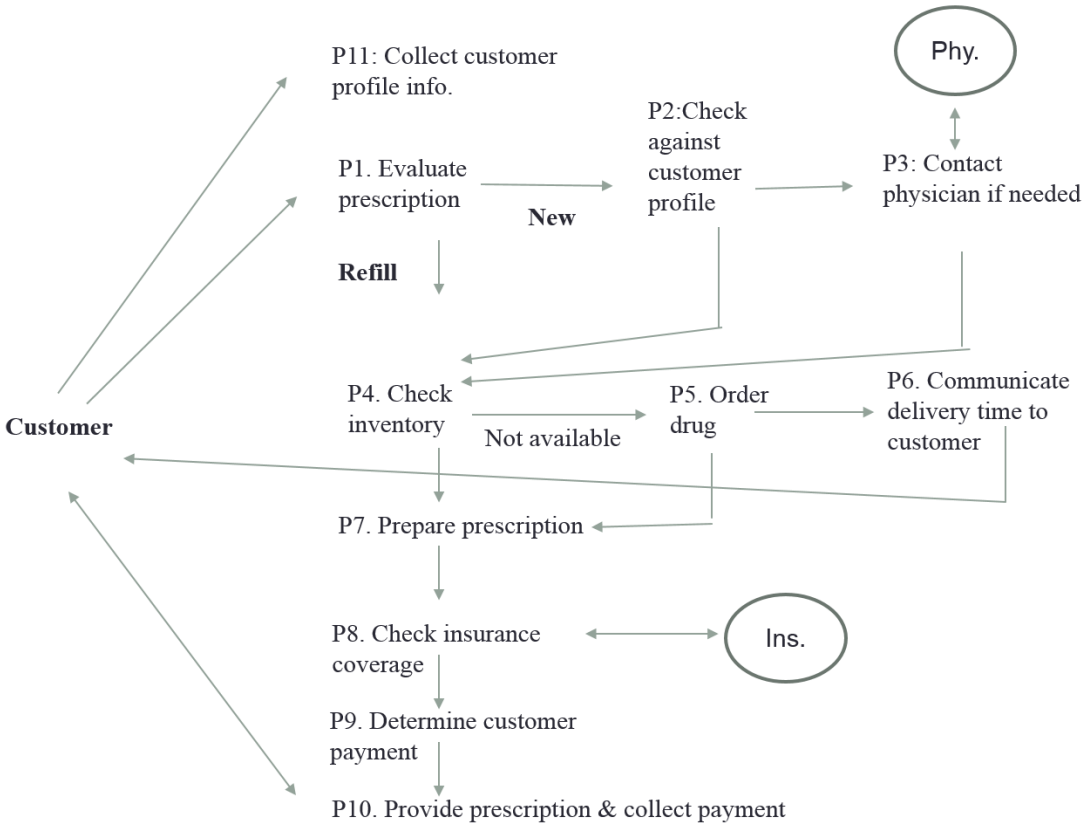


Figure 57 and Figure 5.8 show the processes in a conventional form (anchored on services) or in a matrix form.

The rest of the chapter shows two other types of service/process relationship using matrix form. Ultimately, it is up to the analyst to see what representation makes sense to illustrate these dependencies. Next section will look at potential digitization of these processes as well as their interaction with customer service encounters.

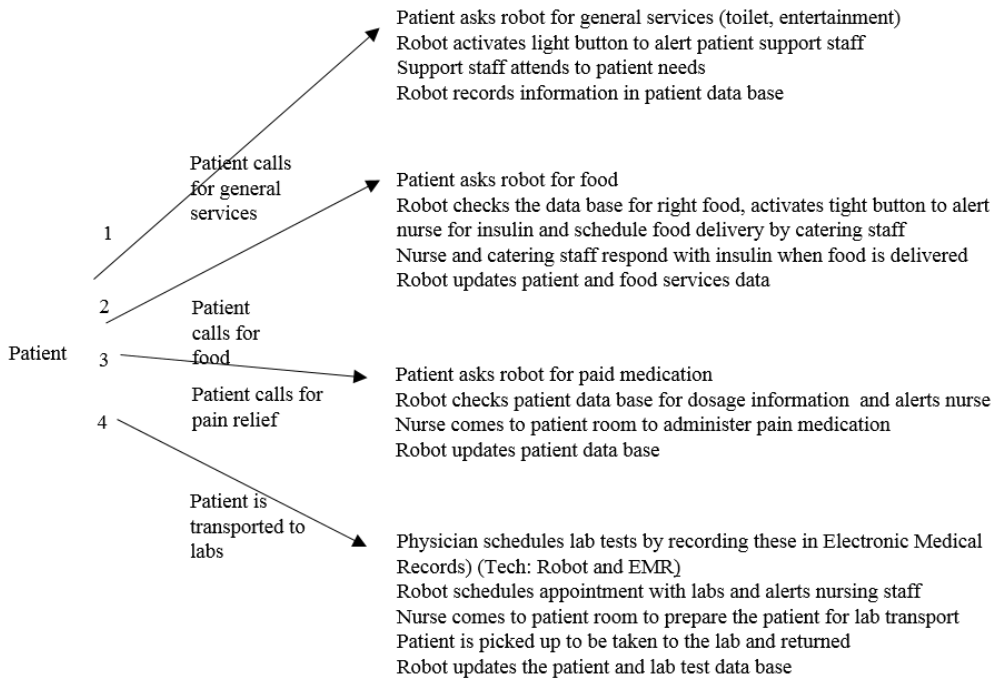


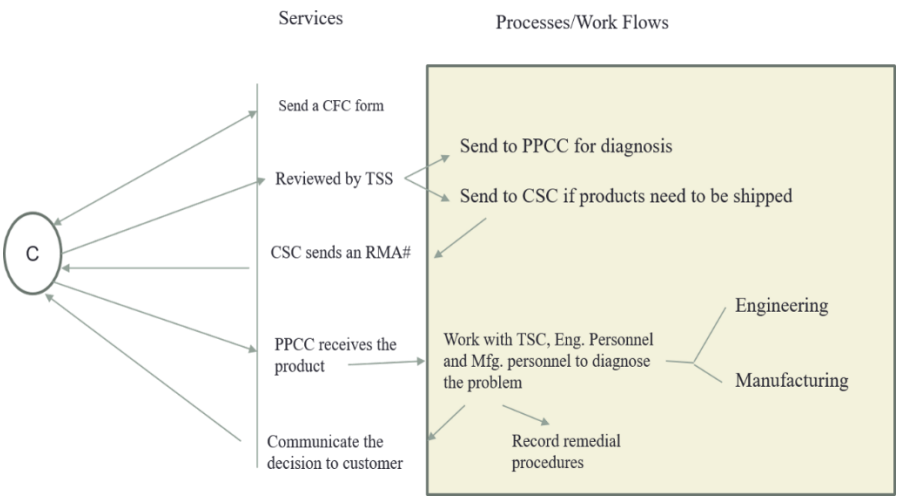
Figure 5.7. Digitization of processes/work-flows using Patient Room Robot

5.8. Matrix representation of services and processes

		Patient calls nurse using call button	Support staff attends to entertainment needs	Support staff comes to answer patient questions	Patient calls for food service	Catering contacts nurse for catering needs	Nurse provides insulin	Catering brings food	Patient calls for pain relief	Nurse checks pain med schedule	Nurse administers pain med	EMR checks patient test schedule	EMR alerts staff	Transport staff comes to patient room	Patient transported to lab and returned
1	Patient Services	X	X	X											
2	Food Services				X	X	X	X							
3	Pain Medication								X	X	X				
4	Lab Visits											X	X	X	X

Below are some example cases and how the process work-flows for these can be represented.

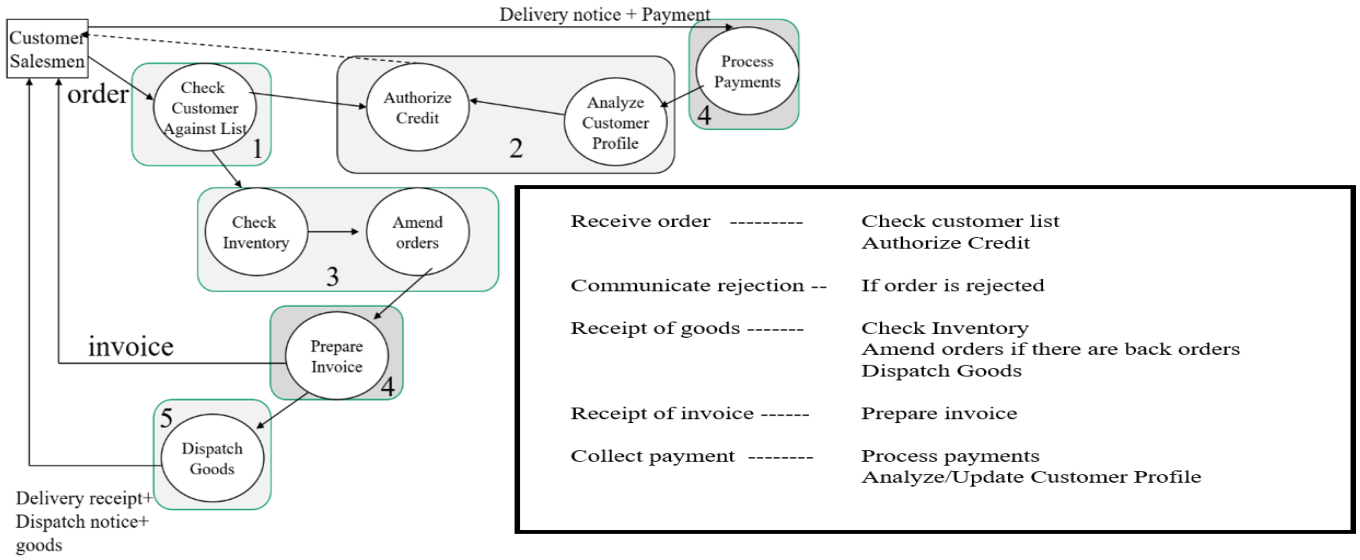
Figure 5.9 A input/output representation from customer perspective



	Customer Encounters	Send form	Send to PPCC for diagnosis	Send to CSC for product shipment	Work with others to diagnosis	Communicate to CSC the decision	Record remedial procedure
Request form	-1	1					
Fill the form	-1		1	1			
Receive RMA#	1			-1			
Send product	-1				1	1	1
Receive decision	1					-1	

Here, -1 represents input from the customer and +1 represent output to the customer by the firm

Figure 5.10. Input and output representation with customer as well as internal processes



		Receive the order	Check customer list	Authorize credit	Comm. Rejection	Check inventory	Amend orders	Dispatch goods	Prep invoice	Collect payment	Update files
Send the order	-1	1									
		-1	1								
			-1	1							
Receive rejection	1			-1	1						
				-1		1					
						-1	1				
						-1	-1	1			
Receive goods	1							-1			
								-1	1		
Receive invoice	1								-1		
Send payments	-1									1	1

Here, -1 for input and +1 for output is shown at all external and internal agent interactions

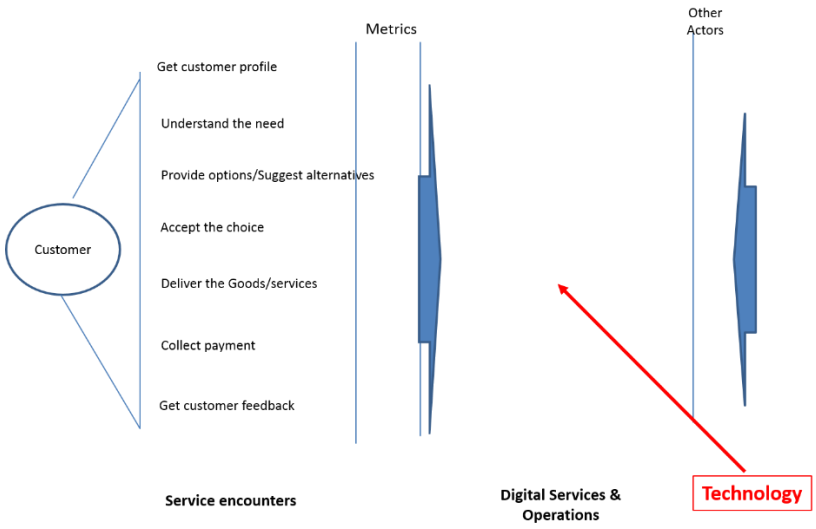
6. Digitization of Service Innovations

In this chapter, the focus is on digitizing various service encounters as well as the digitization of various processes/work-flows that support these service encounters. The relevance and degree of digitization used depends on many factors, such as the nature of information communicated, cost of digitization, an organization's capability to introduce technology, and the maturity of technology developers and users. Some of these issues will be looked at further when we assess the technological risk in Chapter 11. Also, given the rapidity with which technologies are evolving and maturing in development and use, the goal of this chapter is not to discuss all the technologies that are worth exploring to support service encounters and their operationalization. You may refer to other resources available to find out the potential technologies, such as mobile vis-à-vis web based communication, 3-D printing, Internet of Things, Artificial Intelligence//Machine learning, advanced data analytic tools, etc. The goal of this chapter is to isolate each module supporting the service encounters and explore opportunities for leveraging advanced digitization. We will use each of the cases discussed earlier to explore such digitization opportunities.

It is important to review the outline shown in Figure 6.1. to see where we are since we identified the innovative service, as we move to complete the IT or system architecture to design digital services to create value. The service encounters shown here are fairly generic – in other words, they identify basic steps one may take to address a customer need and get feedback. You may have structured your services differently, but it is useful to know that the services you have identified are helping you understand customer requests and incrementally address these requests. In fact, it is always useful to group your backend operations or business processes/work-flows to support each of the individual customer encounters (often referred to as micro-services). Businesses generally group functions based on where they are executed – in specific business units such as order processing, credit validation, order filling, and invoicing. But, it is useful to re-structure or view these processes around customer service modules, as ultimately the different functional units have to work together to fulfill the metrics associated with these service modules.

In summary, you group business processes/work-flows around distinct service modules or segments, then these service segments can be configured differently for different types of customers you may support (e.g. business vis-à-vis individual, new-established-loyal, etc). Now, let us some examples and see digitization decisions are made.

Figure 6.1 Service to Digitization Template



6.1 Digitization of Pharmacy

Let us first elaborate on the prescription processes of the drug store we looked at before (figure 5.5 shown here) using a flow chat as shown in Figure 6.2. The red arrows in Figure 6.2 show the customer interfaces for exploring digitization opportunities.

Figure 5.5 Digitization Options for Pharmacy

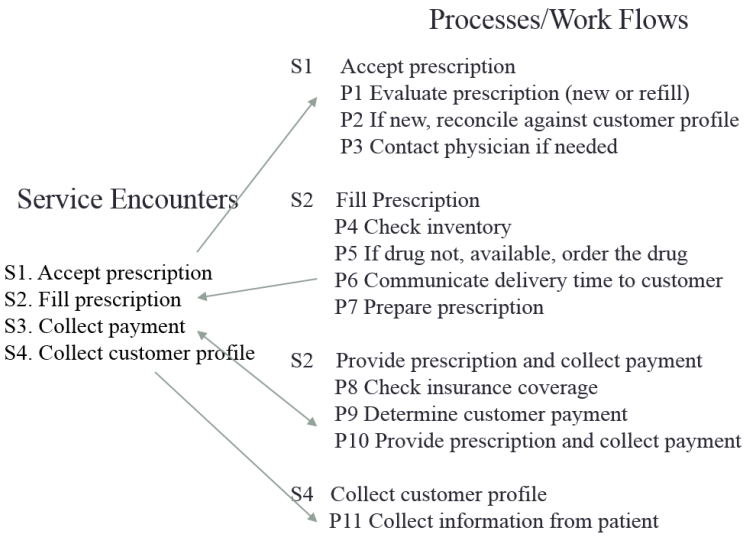
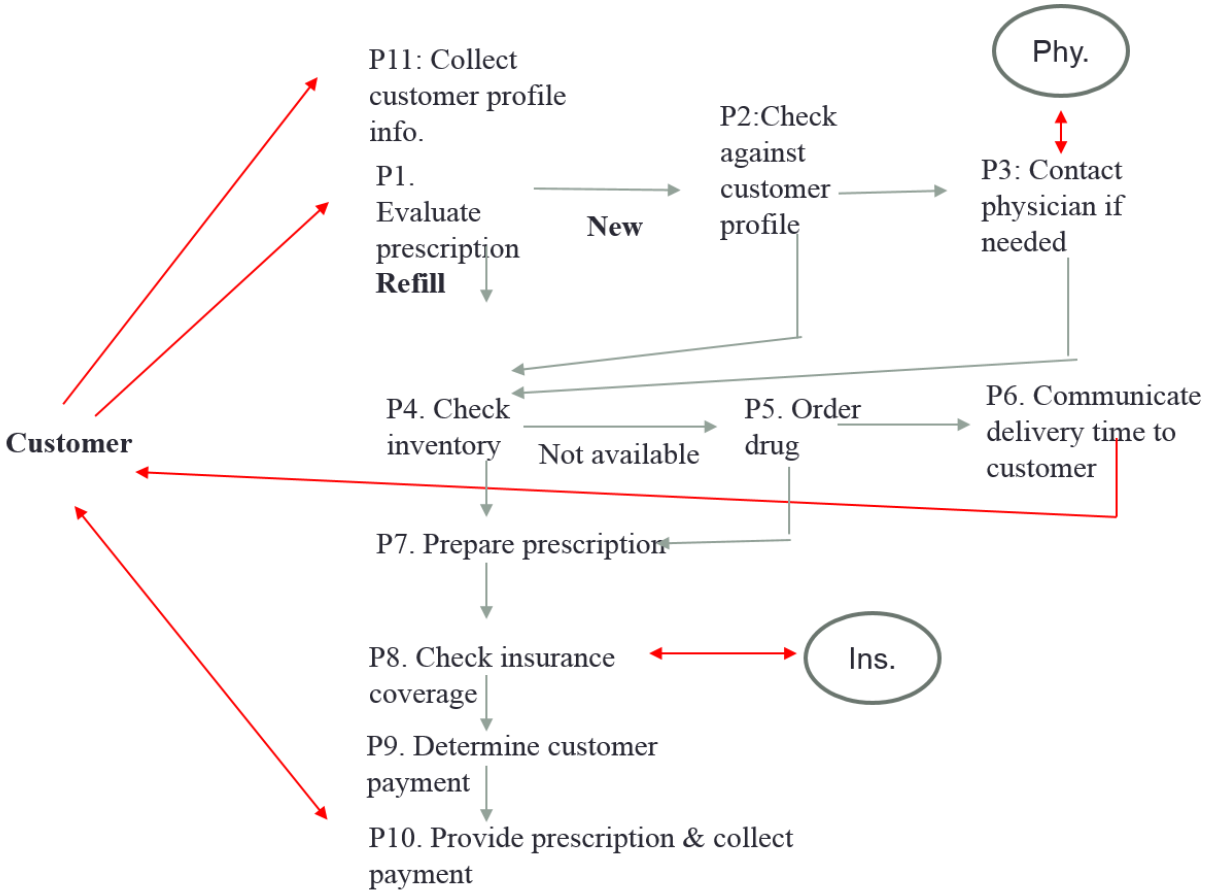


Figure 6.2 Digitization of Service Encounters and Supplier/Partner Interactions



For example, in the innovation discussed here, a prescription can come from patient via a mobile or web interface, and use either of these options to communicate on any information related to the filling of the prescription and collect payments. However, a physical carrier may deliver the prescription to the patient. Also, the interaction between the pharmacy and the physician and insurance company may be completed electronically using established system to system interface with these suppliers/partners or sent via a mobile alert (e.g. talking to a physician).

Next, a decision has to be made on how various processes are supported through advanced digitization. Many processes shown here are simply filling prescription activities internally using highly well defined processes. Hence, they are often viewed as traditional transaction processing systems or operational systems. No major decisions are being made other than simply access data to decide when and to whom to call, and no advanced tools like robotics or other technologies are being used to support these processes. The only process that is done manually is the actual prescription preparation (P7) and some parts of P10 (delivery of the prescription). See Figure 6.3.

The net result of your digitization options for pharmacy innovation is summarized in Figure 6.4

Figure 6.3 Digitization Opportunities for Internal Processes

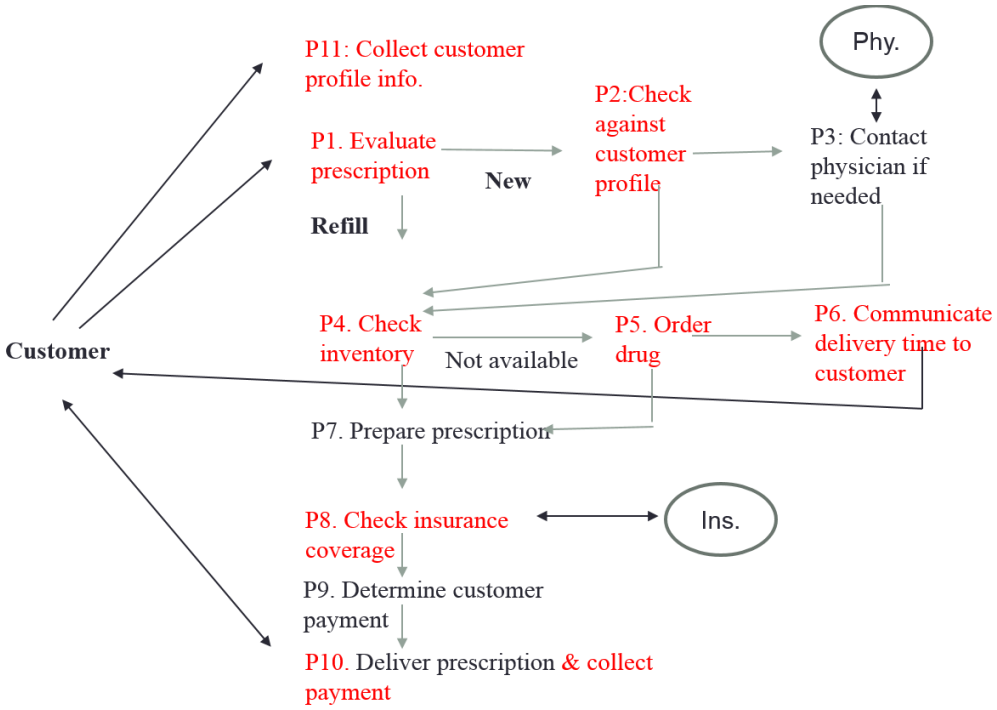
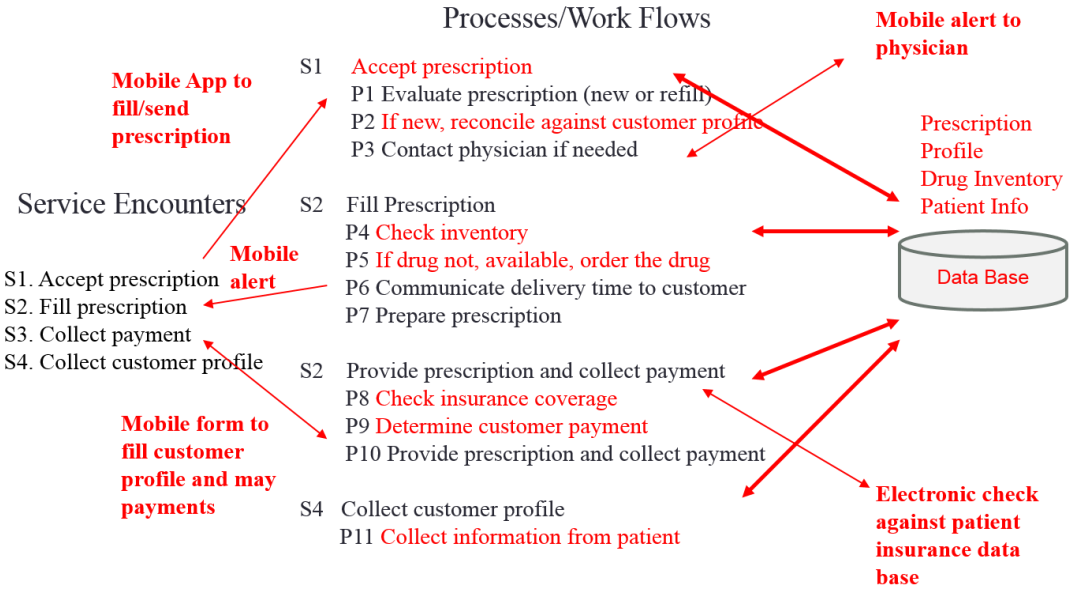


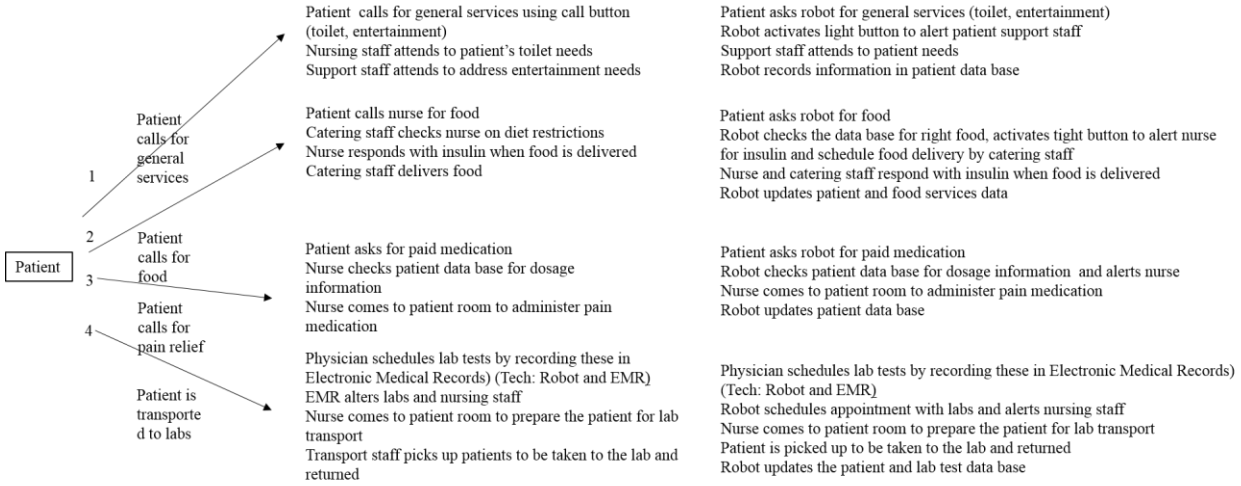
Figure 6.4. Digitization Options for Pharmacy



6.2 Digitization of Patient Room Services

Similarly, the patient room robot case illustrated earlier is shown below in Figure 6.5, prior to and post digitization using a robot in support of patient room services.

Figure 6.5. Patient services before and after digitization



The patient room services can also be represented as a matrix as shown below, as such a representation can be effective in some cases.

Table 6.1 Patient Room Services Represented in a Matrix Form

		Patient calls nurse using call button	Support staff attends to entertainment needs	Support staff comes to answer patient questions	Patient calls for food service	Catering contacts nurse for catering needs	Nurse provides insulin	Catering brings food	Patient calls for pain relief	Nurse checks pain med schedule	Nurse administers pain med	EMR checks patient test schedule	EMR alerts staff	Transport staff comes to patient room	Patient transported to lab and returned
1	Patient Services	X	X	X											
2	Food Services				X	X	X	X							
3	Pain Medication								X	X	X				
4	Lab Visits											X	X	X	X

Each of the cells in the matrix can be looked for digitization and evaluate the nature of digitization that is most appropriate. Note that some cells do interact with an existing patient data using the electronic medical record (EMR) system. Let of take one service encounter (lab visits) (service 4) and explore potential digitization opportunities to improve performance. This is the last row of the matrix shown below.

In the current system, EMR is used to look at a patient schedule and alert a nurse and a lab about the tests a patient must undergo, so that these can be scheduled. Under the digitization proposed, the innovation is a patient room robot that performs as an enabler to support this service encounter. Here, the robot monitors the EMR for patient lab tests, checks the lab schedules, and schedules a patient for the lab visit. It sends alerts to the lab, nursing staff, and transport staff. The nurse prepares the patient for lab transport with all appropriate medical instrumentation. Once the patient is returned to the patient room after lab tests, the robot automatically updates both the EMR with lab results and the patient room database with the time taken for the lab visit. Note the modularization of each automated service encounter or process/work-shown discussed above as shown as modular components in Table 6.2 below.

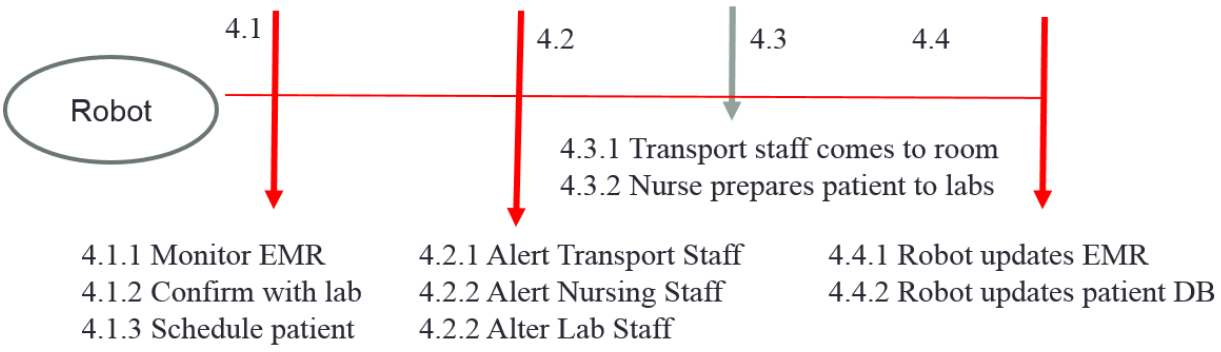
All the digital modules shown in the Figure 6.6 are designed independently, but forming collectively the digitization of Service Encounter 4. One of the goals of digital leadership is to build agility into the system architecture, so that services are to support different customer experiences or even different organizations. For example, thee three different digitization modules such as 4.1 (schedule lab tests), 4.2 (alert staff), and 4.3 (record results and update patient data). These digital modules are further sub divided into modules. For example, interaction with external actors (transport staff, nursing staff, and lab staff as in 4.2) are associated with three different alerts; interaction with software modules (EMR and scheduling software as in 4.1) and from three modules, and updating of patient records (EMR with test results and updates of patient data as in 4.4) has two modules.

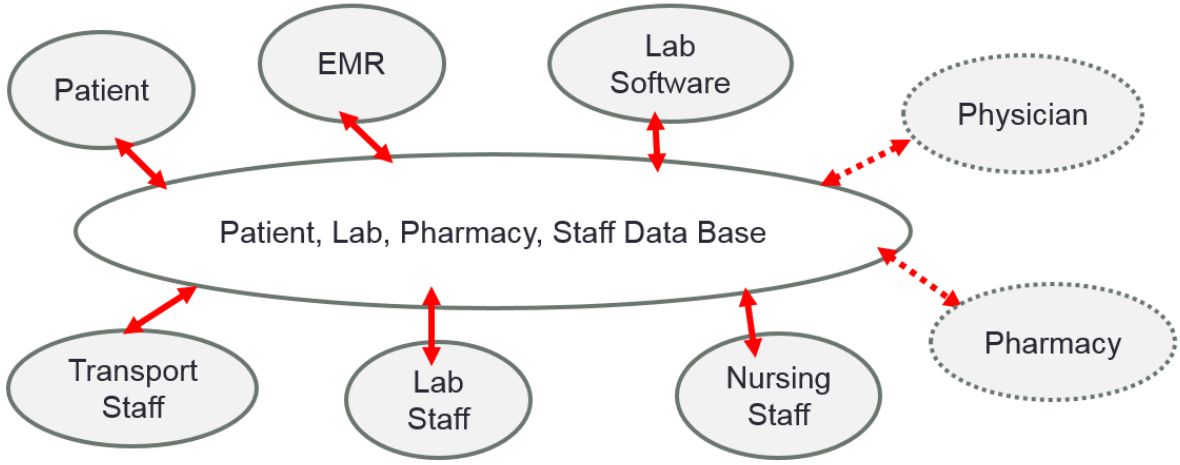
Table 6.2 Translation of Service 4 into Digital Modules

EMR checks patient test schedule	EMR alerts staff	Transport staff comes to patient room	Patient transported to lab and returned

4.1	4.2	4.3	4.4

Figure 6.6 Patient Lab Management System - Modularized





Such a modularization can help one customize robot features if a hospital does not use internal labs for patient testing. IT can then remove this service for lab tests (e.g. scheduling transport services). At the same time, if the robot service supports nursing homes as a part of a new business model, then lab services are replaced by prescription services or physician scheduling services. Similarly, the communication flow with EMR will change if there is a new EMR product or if its architecture changes from in-house EMR to cloud-based EMR, staff and nurse mobile phone technologies change, etc. Given the rapidity with which both the technology landscape and customer expectations are changing, building agility by separating core functional processing of the digital module from its interface modules with various actors (human or machine) can be very effective.

While such modularization appears complex on the surface, a simple matrix representation that shows the relationship between services, processes, and external stakeholders can lead to

potential identification of opportunities for modularization and their potential digitization. For example, Table 6.3 below shows the relationships with external stakeholders for the Prescription@home innovation. Each entry in the matrix can be analyzed for defining digital modules. For example, "collect payment" may be associated with modules "send communication to patient on payment" as an alert, "collect payment" as a digital payment, "record payment in patient file," and "send payment to a bank" as a part of electronic transfer. Similarly, "check insurance coverage" can lead to digital modules such as "send communication to insurance firm, get information from the insurance firm on the coverage, record it in prescription file, and determine patient payment." In other words, by simply noting each entry in the matrix that connects services to processes or to external stakeholders, one can start to define digital modules which can then be reconfigured should the nature of the service encounter or other process/work-flows change. For example, if the patients are segmented into Medicare or Medicaid patients, then the coverage supported by government and insurance communication may be eliminated for these patients.

Table 6.3 Process/Stakeholder Mapping for Identifying Digital Modules

		Patient	Physician	Ins Firm	Pharmacy
P1	Evaluate pres	o			X
P2	Check customer profile				X
P3	Contact physician		i/o		X
P4	Check inventory				X
P5	Order drug, if not in				X
P6	Communicate del time	I			X
P7	Prep prescription				X
P8	Check ins coverage			i/0	X
P9	Det cust payment				X

P10	Prov pres and collect payment	i/o			X
P11	Collect info for pat profile	O			X

The rest of the chapter discusses digitization opportunities for three additional cases (CCS, Domel and ABC). While we tried to identify some broad categories of data that are needed to support digitization, the next chapter will look at some of the steps we will use to build the data warehouse that will support the digital services identified here.

Figure 6.7 Customer Complain Case – Digitization Opportunities

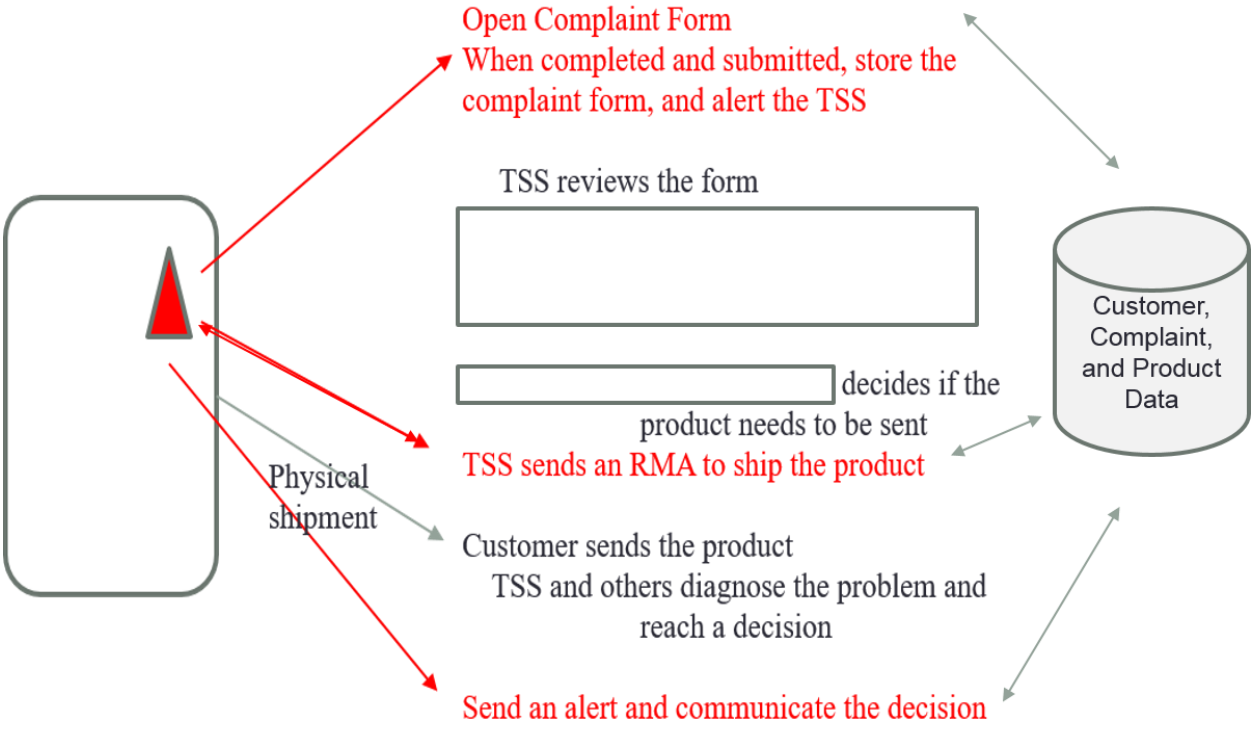
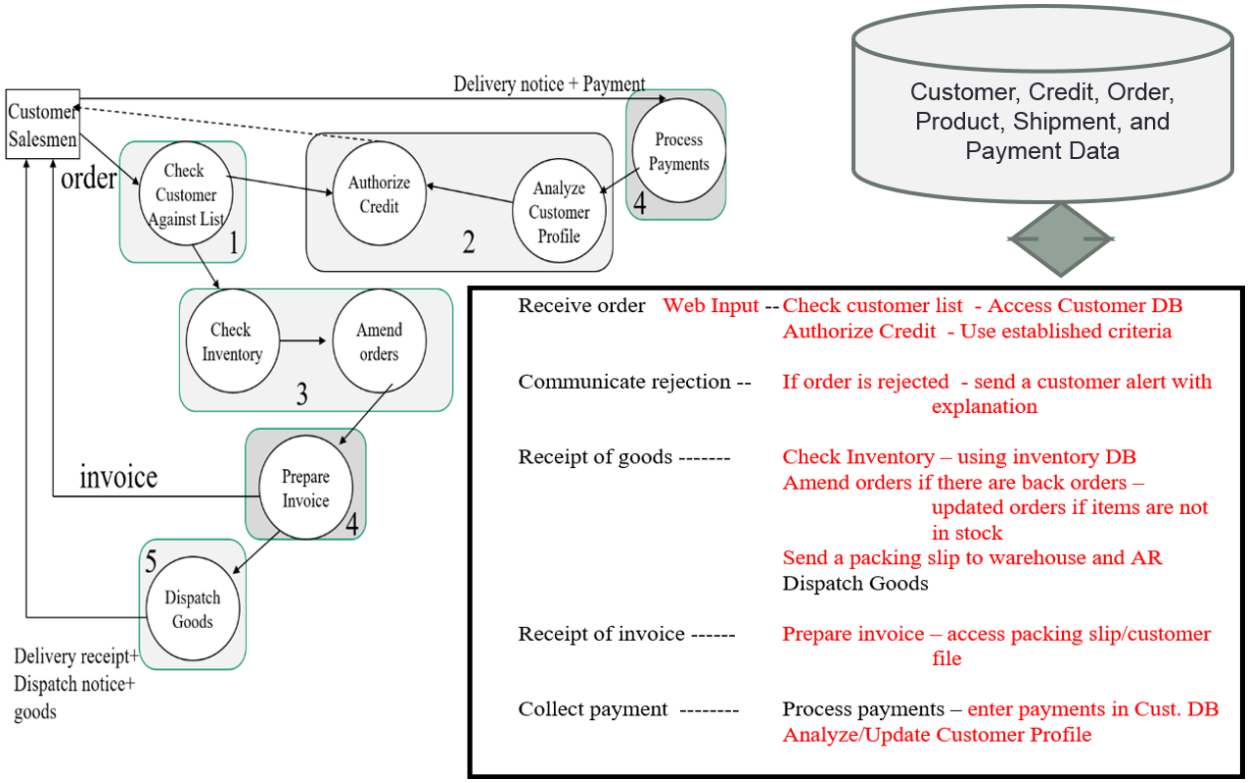


Figure 6.8 Domel Case – Digitization Opportunities



ABC Law Firm

Whenever an attorney spends time on a client matter, that fact becomes information that needs to be recorded. The document on which this fact is recorded is the time sheet. These time sheets are filled out by the responsible attorney, a law clerk, the accountant, or by another attorney.

Customer

Accept a case with information

Record time on a time sheet by a responsible attorney

Record time spent on legal research by law clerk

Description of the service, time spent, and the attorney code (e.g. A4 = Walt).

Record items purchased and disbursement amount by the accountant.

Record time spend by another attorney (time spent, attorney code, service performed)

Turn the time sheets to secretary

Revise case docket book

When a case is closed, transfer the files to a closed client file.

Prepare list of items for a case and time spent when it is time to prepare a bill

Use list of minimum fees for basic legal services, when appropriate

Add disbursements incurred on a case to the bill

Dictate the bill on tape

Prepare and type the bill.

Mail the bill to the client

File one copy and send the other to the accountant

Current statement file for a client is updated by the accountant

Client makes payment

Record cash received on statement cards and cash journal

Prepare monthly summaries.

Digitization with several alerts when case is charged or status changed

Customer

Accept a case with information

Alert and record on time and charges when time is spent by a responsible attorney

Alert and record time spent and charges on legal research by law clerk

Alert and record items purchased and disbursement amount by the accountant

Alert and record time spent and charges by another attorney

Alert and send bill to the client when appropriate

Update client case file

Accept customer payment

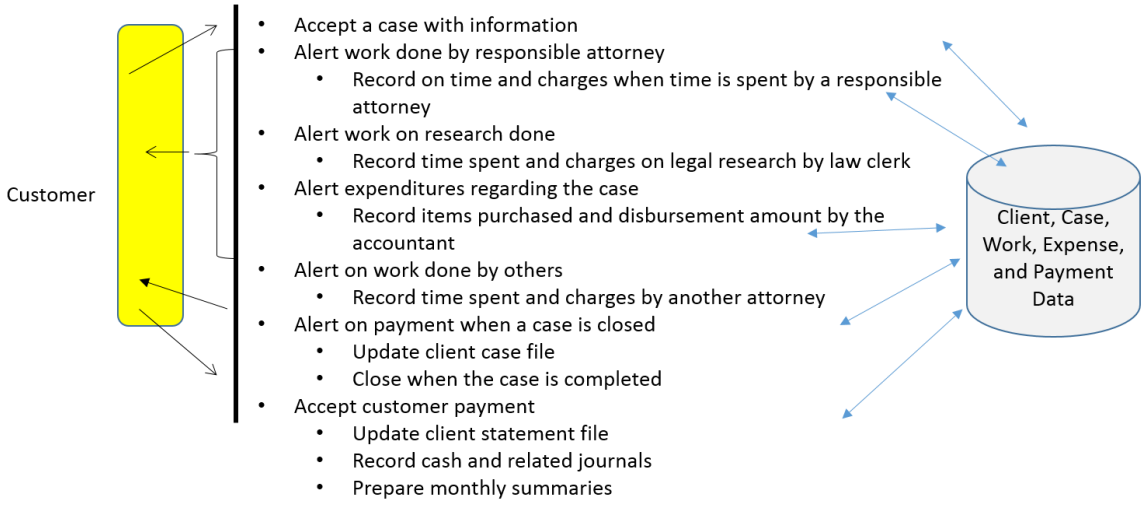
Update client statement file

Record cash and related journals

Prepare monthly summaries.

Close when the case is completed

Figure 6.9 Digitization Opportunity for ABC Law Firm

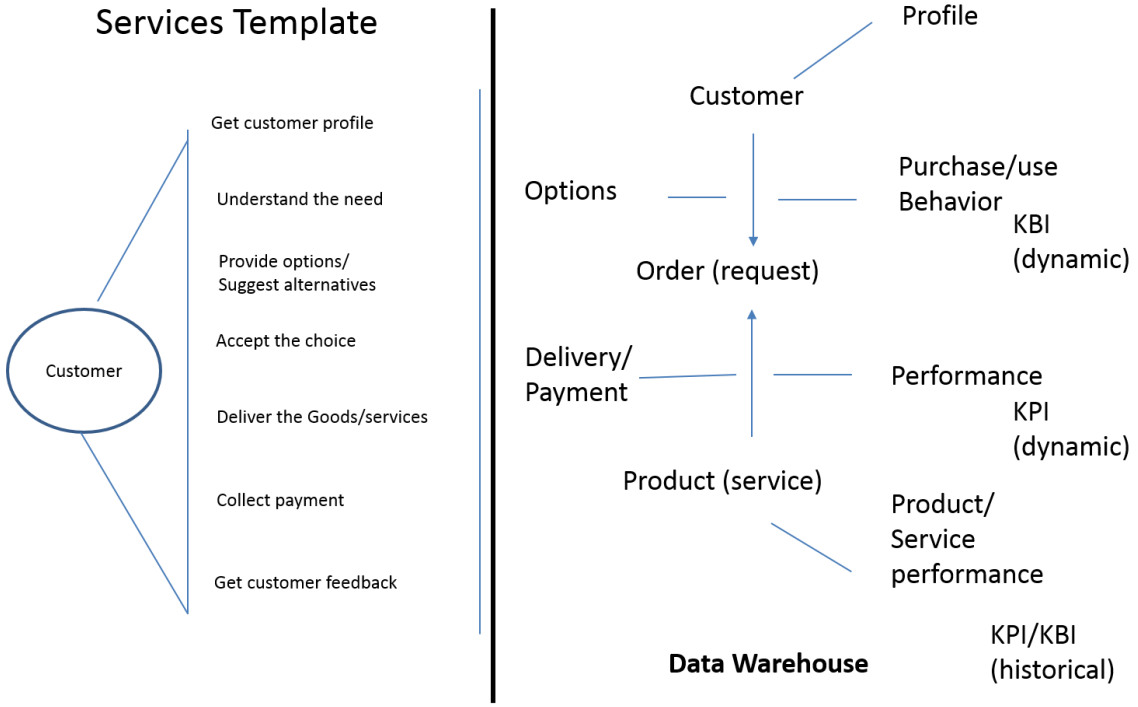


7. Developing a Data Warehouse

In this chapter, our focus is on building a data warehouse to support the design of digitized service encounters and associated processes and work-flows. We refer to the data warehouse as a collection of data we want to gather about the service operations (processes/work-flows used to support each service encounter), as well as other data we need to evaluate the system's performance against the metrics we identified earlier. In addition, we would like to capture additional information about the customer to gain deeper insight into the customer's decision-making process. These data sets can be categorized as: data to support service delivery, data to evaluate services against metrics (key performance drivers), and business intelligence data that gives us insight into customer decision process. While we can represent all the data in the traditional relational database model or some other form, the focus here is on identifying the data we need in a consistent format to support our service oriented thinking:

- Operational or transaction data to execute services
- Performance data to track and assess how well the firm is doing on metrics identified, and
- Business intelligence data that will the firm understand the customer decision making process and use of the product/service post-purchase.

Figure 7.1 A Template for Generating Data to Support Digital Service Design and Delivery



In the Figure 7.1, a few things are worth noting. The services shown on the left are just a template and these are defined to support your application.

Every application normally collects some information on the customer. Some of it may be stored in a profile (permanent data that you may refer to occasionally or want to protect because of its confidential nature) and other data that you may collect to make it accessible to many who need to access to it to contact the customer for any number of reasons.

Let us first focus on the left of the data warehouse template. Every customer places an "order" for services. The order here is used generically and it can be a request for call for service, information, etc. that initiates your activities. This "order" is the second entity on which you like to collect some information such as: when did it come, what was requested, was it completed (led to a purchase of the service or not), was it paid for, etc.

In support of the order, you may interact with the customer a few times such as providing them some information about your firm, options available for the customer to customer to choose from, and back and forth you go through to complete the order.

The input to this order and the associated interaction from the primary entity of your business: the product you are providing. The product can be a physical product or a service product (e.g. restaurant service, delivery service, etc.).

Of course, once the order is fulfilled, you need to record its completion in the order, but also record any payment you might want to collect from the customer. Even if you providing some of these services free, you still want to have a payment record (with "zero" dollars or other currency) to reflect that the transaction is made and order is completed.

The data on the right side of the data warehouse template starts to collect information about the way your interaction went with the customer and how it can be used to analyze your performance. Some of this data is historical – what has been purchased over time, what types of customers purchased, where did these customers come from, when did they purchase it. This information comes from the order and payment data (as these will store the dates of order, what was ordered and paid for, etc.). A part of this analysis can help answer your KPI (Key performance indicators) as we will discuss later in this chapter. A part of the data is collected dynamically as customer is interacting with you through the application. This information can include the type of browser they are using, where did they place the order from, what products/services they are seeking information on before they either purchased the product or decided to leave the app or web site, etc. This type of information, collected dynamically, can give insight into how customer is making decisions, the questions they are asking, and particular information they are looking at before they are making decisions, etc. In today's Big Data terminology, a lot of this information is collected for future analysis of customer behavior and some of it might provide "intelligence: that is useful to better understand the customer. Of course, there are laws that dictate who this information can be shared with (especially if this is shared with other business partners), and what if any can be stored and for how long. More on this later.

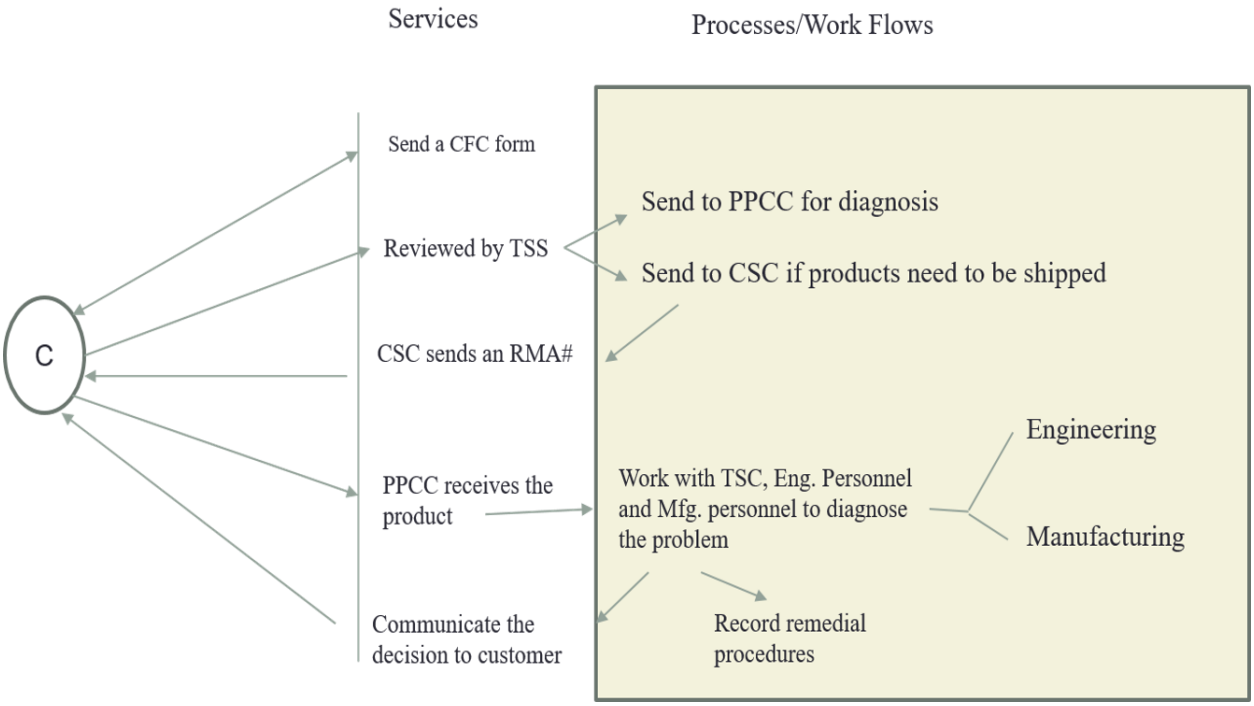
In summary, the goal of this chapter is to focus on how data that is gathered to service the customer needs and specific service encounters support such data gathering. Not only do these encounters generate knowledge needed to complete the customer order or transactions, but they also help you evaluate your service performance and gain intelligence to better service the customer in the future. To illustrate the process, the rest of the chapter looks at several applications we have discussed in the previous chapters.

7.1 Data base for complaint management

This case refers to a firm that manufactures electrical goods and ships to major distributors, retailers, and sometimes to individual customers. The customer may have several issues with the shipment of the product, such as damaged in the shipment, wrong product shipped, the product shipped doesn't work, etc. Customer fills out a form and send it to a technical support specialist (TSS) who may quickly diagnose the problem to reach a decision, or else ask the customer to ship the product to the plant for detailed diagnosis. The firm in such cases sends an RMA number to have the shipment charged to the firm. Based on either preliminary or final diagnosis, the firm can provide a full rebate, re-ship the product, or provide partial or no rebate on the shipment.

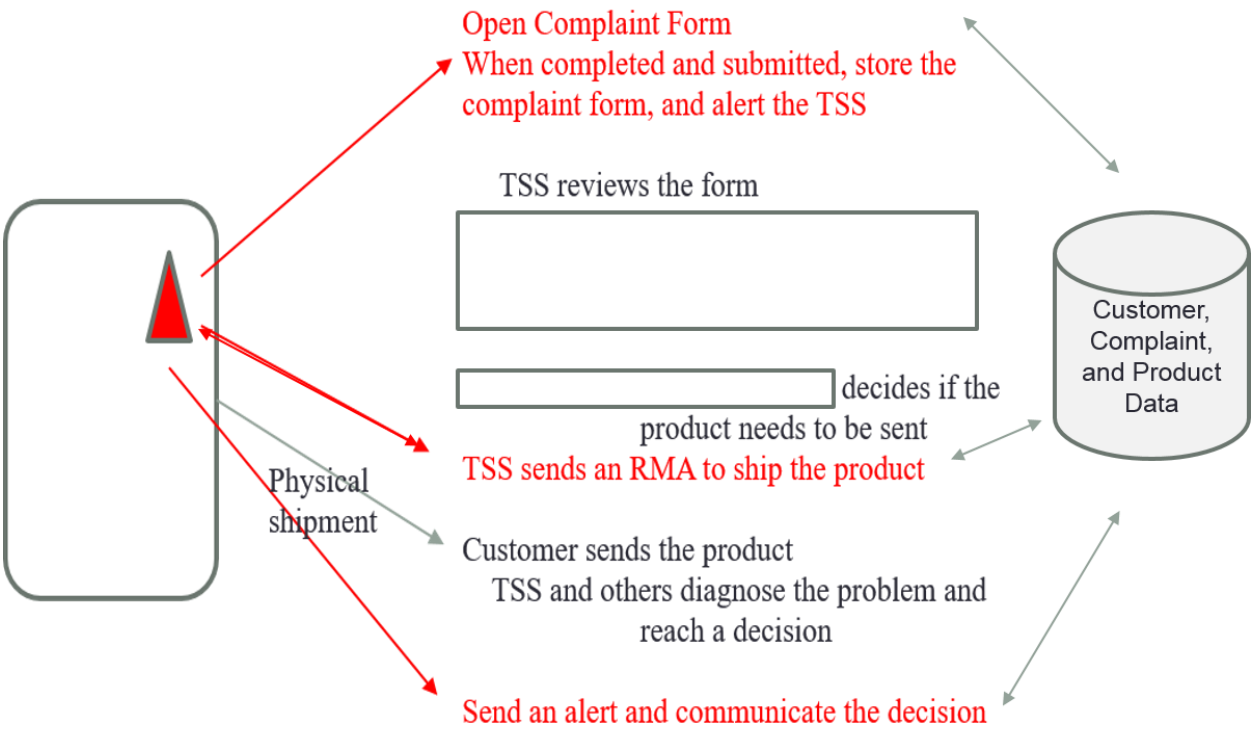
The innovation contemplated by the firm is to allow the customer to use an app to fill out the form and send a picture of the product for the TSS to review before a decision is made to ship it to the plant. The app also allows for quicker communication with the customer. In the future, the TSS may even send a kit for the customer to self-diagnose the problem or even interactively diagnose it with the customer. In any case, the service encounters and the processes used by the TSS in support of each of these service encounters is shown in the Figure 7.2 below. Here, PPCC is the product plant customer coordinator, and CSC is the customer support coordinator. The PPCC may consult with people from engineering and manufacturing if the diagnosis calls for their participation.

Figure 7.2 Customer Complaint System



As indicated, the app designed to support a customer will feature the following digital modules that will be incorporated to support the innovation. See Figure 7.3

Figure 7.3. An illustrative use of mobile application to support customer interaction

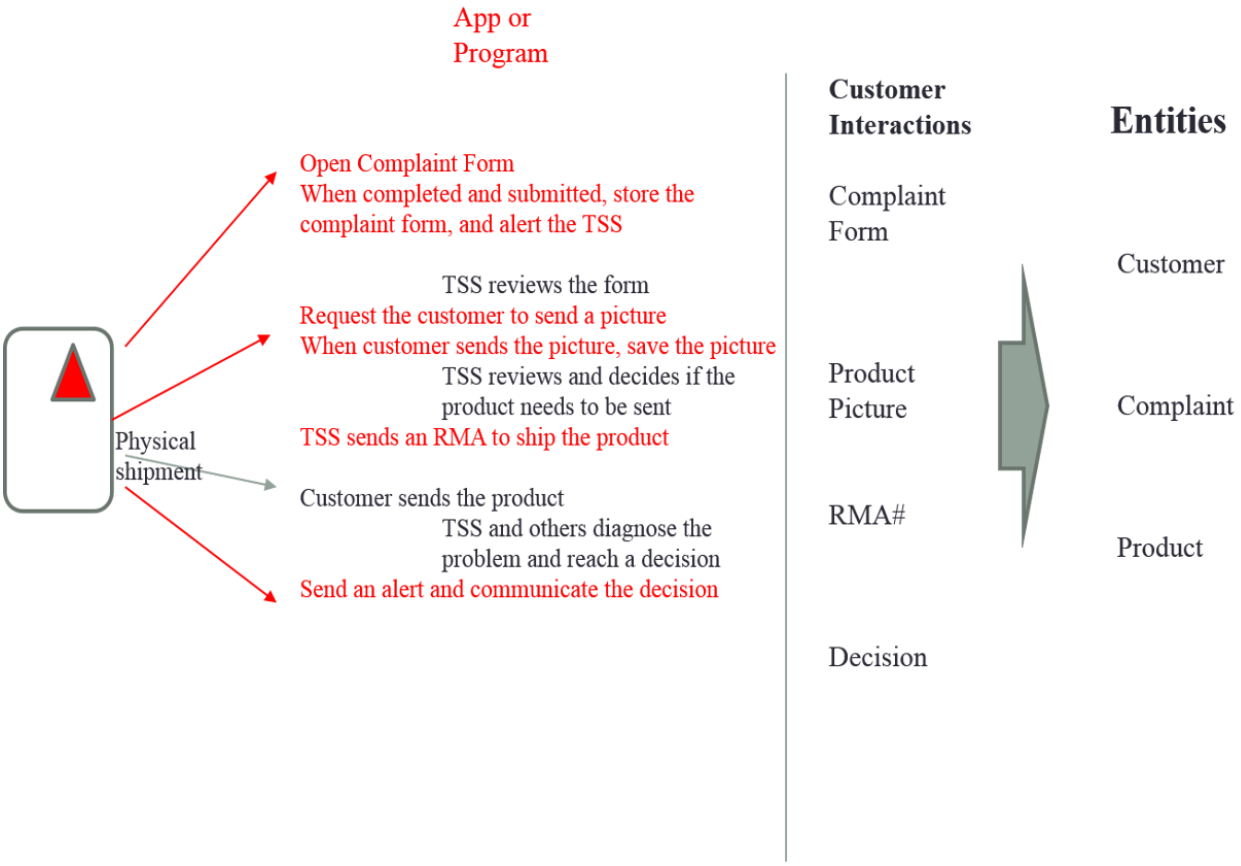


The red highlights the digital communication/interface with the customer. Also, all non-customer interfacing activities are indented to illustrate which processes/work-flows support these service encounters. Some service encounters are not automated, such as the actual shipment of the defective product to the plant. To illustrate the value of modularization of the code in terms of service encounters, a firm may decide to segment its customers into groups such as large and loyal, large to medium regular, and small, and it may decide to allow the app to be configured differently for each customer segment. For example, the large and loyal customer app may only have one service encounter where, once the customer form is filled and sent, a rebate or reshipment will occur automatically. The review of the defective product may occur in parallel without further delay.

Once these digital interactions are highlighted, then the data that must be collected at each of these steps is identified and aggregated for review. For example, the service encounters need a form that captures information about the customer and product complaint, a product picture if it is gathered for remote review, the RMA number sent to the customer, and a decision regarding the complaint communicated with the customer. The firm may use product design documents for internal review, and may also store the decisions for future analysis. Some of these interactions and the data that may be gathered is shown Figure 7.4. Note that these are steps that move you from forms or individual data items you provide to the customer in the encounters (e.g. RMA#, complaint form, pictures of products, etc.) to specific entities that might actually store this data.

Also, some of the information, like RMA# might not be stored in each complaint (as it may be the same for all), and only a simple flag (yes/no) might be noted if the items were shipped. Also, there may be a diagnosis type noted on the complaint after resolution (e.g. shipping problem, wrong product shipped, minor defect, or major defect).

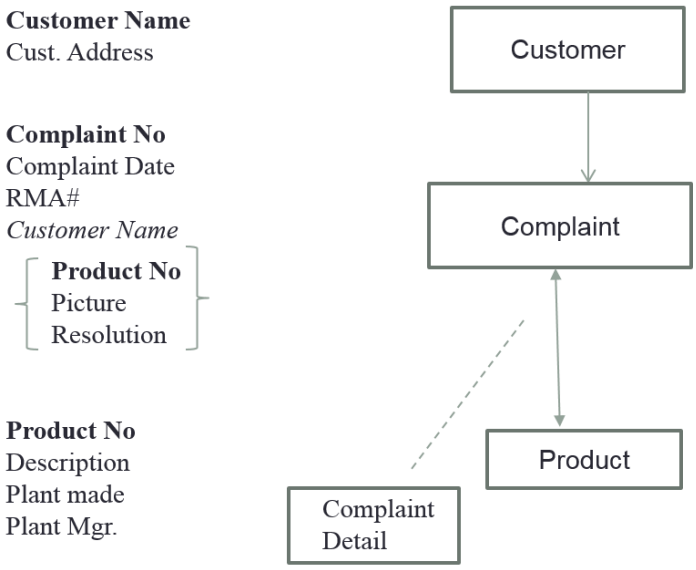
Figure 7.4 CCS Data Capture Phase 1.



The goal is to eventually group all the data collected and associate this to entities such as complaint, customer and product. This is shown in Figure 7.5. Note that we have identified each entity with some distinct key and some entities may have multiple occurrences like a complaint may be associated with several products. It was shown on the left with brackets under Complaint entity, and as a complaint detail on the right (a relational data base convention as this detail connects complaint with product on which the complaint is about).

Next, we will look at the service metrics that are used to assess how well each of the service encounters was handled. Note that while the final goal is customer satisfaction with the outcome, it is useful to track the time or quality of interaction at each service encounter to ensure the customer is supported throughout their entire experience. This is very crucial when dealing with customers that only use a virtual interface to complete a transaction.

Figure 7.5 CC Data Capture Phase II



7.2 Key Performance Indicators (KPI) to Assess Performance on Customer Service

Some of the metrics associated with service encounters are listed below.

- Timeliness in getting the form loaded in the App
- Timeliness on the preliminary decision
- Accuracy/clarity about where to send the product
- Ability to track the diagnosis state
- Reasonable explanation for the final decision

The goal is to make sure that the service metrics can be measured and improved. Some of the data that the system should track include:

- Complaint recording time
- Complaint preliminary decision time
- Product distribution time
- Complaint tracking capability (yes/no)
- Complaint final decision time
- Customer satisfaction regarding rationale

For this application, all this information is captured as a part of the complaint entity as shown below (red items showing the additions to the data we had before)

Complaint

Complaint No
Complaint Date

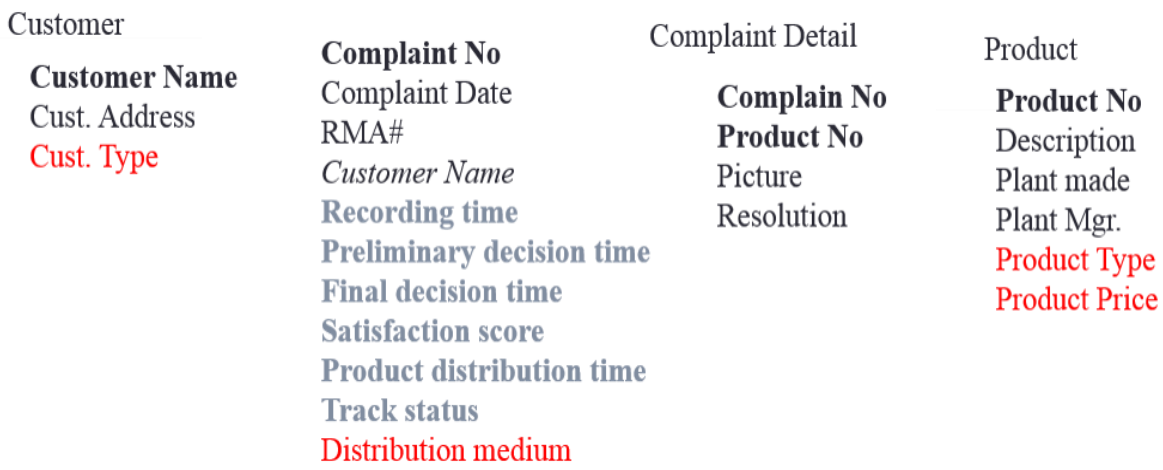
RMA number
Customer Name
Recording time
Preliminary decision time
Final decision time
Satisfaction score
Product distribution time
Track status

Of course, if the organization also wants to track the complaints by customer type, product type, customer region, product price, and distributor (as shown below), then this information may be stored in the appropriate entities such as customer (type and region), product (type and price), and complaint (distributor used to ship the product). Some of this may be business intelligence that is needed to segments customers and products to better manage complaints in the future.

Customer type – individual, company
Customer region - urban, rural, suburban
Product type - small, medium, large
Product price - low, moderate, high
Distributor used to ship product

This information is critical to ensure that not only is customer satisfaction and support monitored carefully, but managers have other information to make decisions to reduce the occurrences of such situations in the future. This is typically a part of management information systems or decision support systems. In Figure 7.6, the performance data is shaded blue and the intelligence data is shared "red." Note that the distinction between these two is often blurred as the goal of a firm eventually use all this data to better service the customer, except some data is collected through deliberate planning and some is collected adhoc for analysis.

Figure 7.6. Grouping some of the performance and business intelligence data



7.2 Business Intelligence to gain better insight into the customer interactions

One of the key benefits of having customers use a mobile app or even a Web app is that there is more information that can be gathered about the customer interaction. Some of this information includes: the time they needed to complete transaction, the number of times they interacted with the app before they leave or successfully complete an application, what browsers they use, and where they are interacting from, among others. In fact, if they are a part of a loyalty customers program or receive some free "goods" if they register and provide information about themselves, other demographic information can be gathered, such as age range, gender, employer type, etc.

Of course, there is always risk associated with collecting some of this information because of how it gets used or what data gets lost that may put a customer in jeopardy. While we get to the data compliance related risks later in Chapter 11, having such information can be effective in segmenting the customers, transaction times/periods, etc. for better tailoring an organization's services to retain customers. For example, in the case discussed above, the time it takes to complete a form may indicate implicitly the difficulty in the design of the form. The frequency, date/timing, and location where the complaints are coming from may tell us something about the product functionality in certain regions of the country or at certain times (winter vis-à-vis summer).

In the Prescription@Home example, one can seek information that can give better insight into how seniors make their prescription ordering decisions and what are some of the nuances in the way physicians answer questions, as these may be relevant to improving pharmacy operations. In fact, it is useful to ask yourself several interesting questions you would like to have answers to before you start collecting information, rather than randomly collecting a lot of information (because it is available) with no specific purpose. This is especially crucial if you are liable for information lost or stolen. In the case of Prescription@Home, the following questions may be useful to answer besides filling the prescriptions:

To reduce delays or plan ahead of time to get a physician to verify a prescription

- When is the physician available to call for verification?
- To better plan to collect the prescription by sending alerts
- What is a good time to get prescriptions from patients?
- When do patients send their prescriptions (time/day)?
- Who sends prescriptions (patients or family members)?
- How do they send prescriptions (email, apps, web, etc.)?
- Where are prescription calls coming from (street, county, region, etc.)?
- To better allocate resources to fill the prescription without errors – explanation is critical
- How many patients ask for an explanation, and what types of explanation do they ask for?
- How many need reminders on refills?
- To better plan the stocking of prescriptions
- What type of prescriptions are ordered most and by whom?

To answer some of these questions, you might use the information you already have (analyze the prescription dose analysis to forecast stocking needs), while other information may be collected (who is ordering the prescription – senior or a family member?). Such an analysis may lead to the database that supports the pharmacy shown below (red items indicating new items added to gain better insight into seniors' ordering process), as shown in Table 7.1.

Table 7.1 Data Warehouse of Pharmacy@Home

Patient	Physician	Insurance Firm	Drug	Prescription	Prescription Det
P Name	Physician ID	Ins Firm Name	Drug No	Pres No	Pres No
Address	Contact Info	Address	D Name	Date of Pres	Drug No
Contact Info	Time to call	Contact Info	Price	% covered	Dosage
Allergies				Amt Paid	
Drug History				Physician ID	
Family History				Ins Firm Name	
Account Info				P Name	
P Satisfaction				Amr Adjusted	
P Region				Receipt Time	
Reffil Reminder				Delivery Time	
				Error status	
				Sender type	
				Medium	
				Explanation	

In summary, the role of KPI is to measure an organization's performance against stated service metrics, and the role of BI is to dig deeper into information that may give insight into the type of customer interacting with the organization virtually and their decision-making process. Appendix 7.1 illustrates the derivation of data warehouse for two of the cases discussed earlier: Kay's originals and patient room robot.

Obviously, the more insight the data gives, the better you can reconfigure your services to support different market segments. While mass marketing may be difficult when you are dealing with any number of virtual customers, the goal of building agility in the system service architecture is to help support certain level of customization through selective reconfiguration. We will address this in the next chapter under product positioning.

8. Positioning

8.1 Introduction to Business Architecture

We have been working thus far to develop a system architecture that translates services into digital services, i.e. services that are automated to support customer expectations. The system architecture includes a mix of automated and manual processes/work-flows, along with the data warehouse that collects information to support the business (operational as well as decision making). The challenge up to this point has been one of looking at various technologies that can be leveraged to innovatively provide services to support today's empowered consumer. However, for the innovation to reach the consumer, the value of these digital services should be appropriately communicated to the consumer and delivered to them effectively. While generating financial incentives to the firms delivering the services, the services have to be agile enough to support the ability of the firm to make changes to these services quickly if needed, as customer expectations can change rapidly.

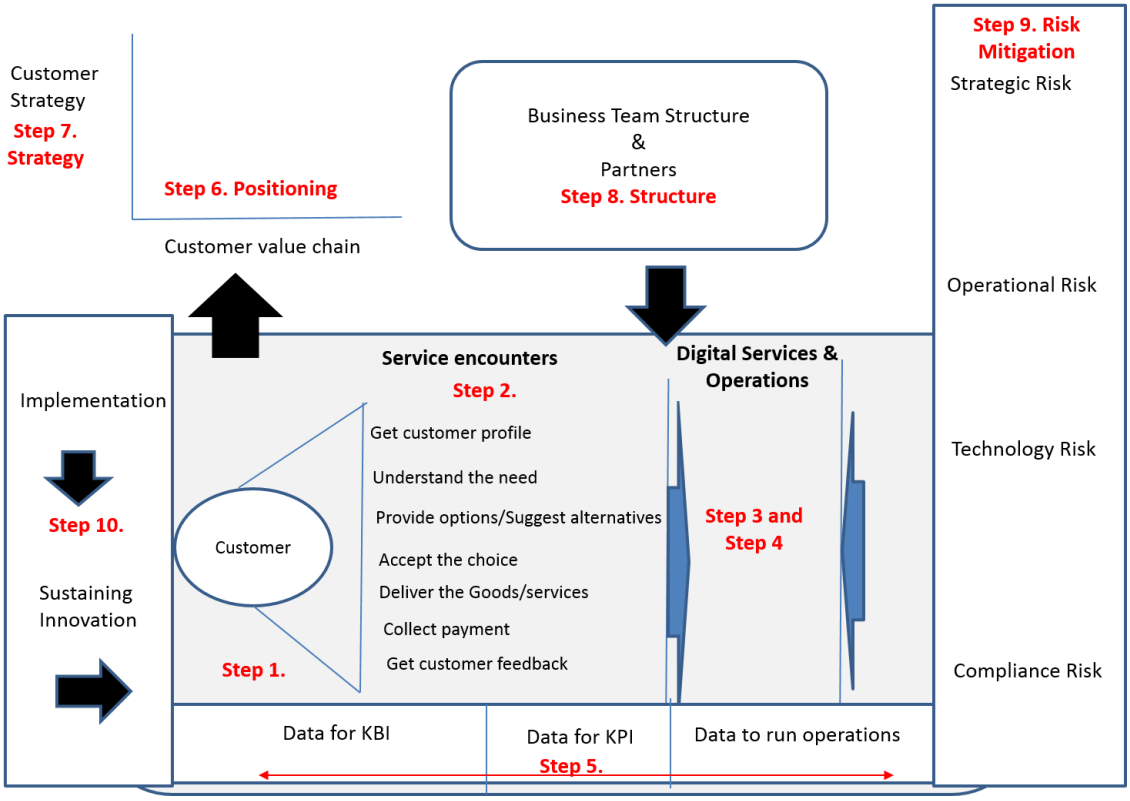
Broadly speaking, the top half of the Digital Leadership framework – defining the business or organizational architecture that delivers digital services to consumers and generates revenues, has to as agile as the system architecture that is used to design these services. For our discussion, the business architecture is not divided along traditional business functions like accounting, marketing, management, financing, etc. in support of various value chain activities of Porter [1980], even though these functions are embedded in the architecture discussions. Rather, the goal is to view the business architecture through the eyes of the customer receiving these services:

- How do these services address the decision processes of consumers and address customer goals (positioning and strategy), and
- How are various services designed and delivered effectively and accurately (organizational structure and risk management)?
- Eventually, when these services are implemented to support customer needs, such implementation should lead to the next set of innovative value propositions the firm should plan to explore.

In other words, while the goal of any business endeavor is to generate revenues and maintain profitability, such an endeavor cannot be successful if it does not meet the operational needs and decision-making processes of customers and address their evolving expectations on a sustained basis. The choices businesses should consider are to be viewed through the customer lens and let the agile system and business architecture of the business support customer decision making process and its continued evolution. To view a business through the customer centric lens, we will map implicitly business functions (such as marketing, human resource management, operations, finance, purchasing, technology, and corporate administration) and their strategies to customer service needs. This includes positioning a service to meet a customer need (along customer value chain) and supporting a customer strategy (cost to differentiation). The management of customer service delivery includes structuring the organizational resources (internal and external) of the business and deliver these services to mitigate customer risks (as well as those of the business). This service is then implemented to not only meet customer expectations and mitigate customer risks, but also lead to new value creation. The template for the next five steps (6 through 10) is

shown below (Figure 8.1). In this chapter, we will focus on the "positioning" of the service along customer value chain.

Figure 8.1 Business Architecture Outline to Support Digital Services



8.1 Positioning

When consumers purchase a service (or product to deliver a service, such as buying a coffee pot to deliver fresh coffee), they are often looking to position this service within their day-to-day activities to do two things: reduce a stress or time pressure (or "pain," as entrepreneurs like to call it) or support a desire (or satisfy a wish). Naturally, most consumers are eager to hear what you want to say about how your service will meet either of these goals before they consider paying for the service. It is often much harder to get their attention about a service that they have not thought about and have not wished for, much less considered how much they are willing to pay for it. For these reasons, it is very important to view the services being developed through the eyes of consumers and see how you can address their "pain or stress" or interact with them extensively and gain their trust to know what they want.

Even if you think your service is very innovative based on your own understanding of customer needs, it is not always easy to gauge how a customer or a sufficient segment of the customer market views your idea. For these reasons, customer interaction and engagement is key throughout the service design process. It is even more critical now, before you invest more organizational resources, to assess the commercial viability of the service and plan its

implementation. In fact, customer interaction as a part of positioning may help you redesign some of the service features, i.e. go back to the design that you thought was already complete.

Positioning is not marketing or selling, Marketing often looks at potential opportunities for commercializing your ideas in the early stages of your service design process. You may have done that already if your innovation evolved from a market analysis and identification of needs. If you have developed it simply by viewing yourself as a consumer, then it may be appropriate to use multiple customer interactions to make sure you are addressing the right need. On the other hand, selling involves presenting the service to potential customers and communicating its value. The goal of positioning, on the other hand, is to ensure that the service is put in the right context in support of a customer decision-making process or in support of their operations so that you can assess its fit and what it will replace, etc. Given that such a fit can vary with different customer segments or the same segment making decisions at various points in time, positioning should allow you to alter the way that you communicate the value of your service to a customer segment. In some cases, you may even tweak the design of the service here to ensure it meets the customer need. It is also conceivable that you may look for a different market segment (individual customer vis-à-vis business consumer, or the other way around). All of this means that you need flexibility in positioning your service.

Flexibility in positioning is one of the reasons for designing services in a modular fashion, so that they can be re-configured as needed. For example, Prescription@Home may be designed for seniors who want to be at home, but you may discover that most seniors like prescription reminders and prefer to go to the pharmacy for general purchases and pay for them in person. If so, your Prescription@Home may be re-configured as OrderPresciptoinFromHome, while the full product is only used by those seniors who are not very mobile. You may even choose to sell a version of this service to existing pharmacies. In other words, positioning may lead to market segmentation or a recalibration of your service offering, thus making you go back to certain parts of the service architecture.

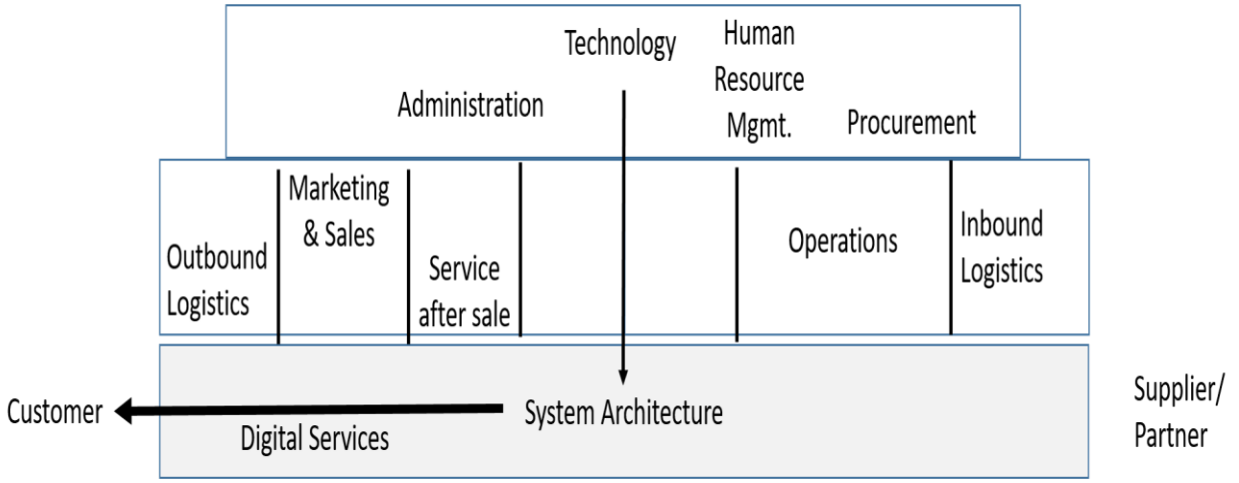
As you will see in the last step of digital leadership, service implementation can also help you learn more about customers, leading possibly to new innovations of your existing service or to positioning the current service to an entirely different market. However, it is better if the positioning can lead to you learning about the customer market before you invest too much of your organizational resources into developing the business. In fact, this is one of the characteristics of the "faster speed" approach employed in developing innovative products today. Customer expectations evolve rather rapidly, and with growing competition in digital services, quickly noticing potential changes in customer expectations or new opportunities evolving from advanced technologies can help you best position or re-position your service. The faster speed should allow you to quickly go back to the drawing board and re-design some parts of the digital service. Given that you can position your product to an individual customer or a business customer, we will address each of these in the rest of the chapter. First, we will focus on the business customer – positioning the service as a B2B (business to business).

8.2 Business Consumer

Porter's value chain can be used to view a business customer's activities, which are categorized as primary (those that create value) and support (those that oversee the primary activities). These activities are clustered around the demand and supply side of the value chain as

shown in Figure 8.2. The supply side activities include interactions with suppliers and partners, and the demand side activities include interactions with distributors, retailers, or end customers. Technology development is not simply a supporting activity today, but is embedded in many of the primary activities as digital services. It is one of the reasons why business is undergoing a significant transformation. Some technology related to infrastructure (communication and networking infrastructure), enterprise applications (software designed to support established business operations such as SAP), data centers, or robotic machines in manufacturing, etc. can be viewed as supporting technology activities. Some of the digital services support demand side activities, some support supply side activities, and others simply support business operations and support activities. If a digital service is designed to support a business customer, what part of the business customer's value chain does it support, and how do the business customers assess its value?

Figure 8.2 Revised Porter's Value Chain



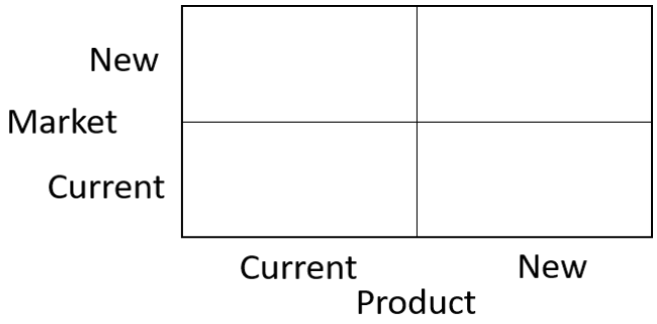
8.2.1 Expand Business Customer Market or Offerings

Does your service support a firm's current product or its new product, and does it support its current market or a new market? See Figure 8.3. The assumption is that if a service you provide is helping the firm continue to operate in its current product/current market (lower left quadrant), then it is simply helping it to retain its customer base and support the firm's competitive strategy (we will discuss in the next chapter). However, a digital service can also help the firm expand its current product/service to a new market or offer an entirely new product to its current market. For example, Prescription@Home can be offered as a digital service to a pharmacy, and this can help the pharmacy reach a wider geographical market (current service to a new market), or the pharmacy can offer it as a "prescription reminder" service to some current customers (new service to its current market). Similarly, the personal robot designed to support patient room services in a hospital can be configured differently with new services to support critically ill hospital patients at home post discharge (new product and new market).

Given the competitive nature of business today, it is always useful to position your digital service in terms of its capabilities to help your business customer's competitive needs (i.e. expand

to new markets or deepen the value of its current product). It is often much harder to position your digital service to support the upper right hand quadrant (new product or new market), unless the business consumer is using your innovation to explore a new market (e.g. international) with a new product (e.g. a variation of its product that leverages the firm's expertise). For example, the digital service App designed to address customer complaints regarding product defects can be sold to a firm that wants to expand to international markets (new market) with a self-diagnosis expertise embedded App (new product) to knowledgeable consumers so they can fix the product, or provide this expertise as a cloud-based service (new service). In summary, the focus here is on understanding the business customer's demand chain goals and help enhance their business model.

Figure 8.3 Positioning the Service in Market Positioning



8.2.2 Enhance Performance of a Firm's Operations

Business consumers are always looking to reduce their cost, improve the quality of their service, or make better decisions, and each has its own metrics. If your digital service can reduce costs, it is easier to demonstrate this value by comparing the new costs with the digital service to the costs prior to using the service. For example, if a hospital is experiencing costs attributed to either poor service (e.g. complications due to delays in providing pain medication) or extended length of stay (e.g. taking too long to get tests done promptly prior to discharge), then a patient room robot can be positioned as one that reduces these costs. If, on the other hand, if it is positioned as one that improves quality of service (e.g. patient satisfaction), then it is a bit harder to assess the value of the robot, given the number of factors that can influence patient satisfaction. Positioning a digital service as one that can improve decision making is often the hardest. For example, predicting future needs on tests or pain management protocols based on data collected by a patient robot on previous patients may be a nice feature to explore, but it is much harder to communicate this value in tangible terms.

For these reasons, metrics used to position digital services should look for opportunities where the benefits can be shown clearly. The tangible metrics need not always be in monetary terms but can be observable and measurable (e.g. time to respond to a patient call for pain request). If you defined metrics in the design of services (e.g. timeliness, customer satisfaction, etc.) in Step 2, you may want to revisit these metrics and possibly refine them based on how you are positioning these services to business customers, and this may alter the way you collect data. For example, if Prescription@Home is being offered as an important service to a business customer (e.g. independent living facility), the service metric that is appropriate for such a facility is enabling social interaction of senior patients when they come to either provide or pick up prescriptions. In this case, it is not the timeliness metric (how quickly prescriptions are picked up or filled) that is

important, but rather the business customer's ability to schedule a pick-up and delivery during these social times. Such a change in metrics may alter the way the Prescription@Home service operations are designed for schedule and pick-up, including physician verifications.

8.2.3 Enhance a Firm's Supply Chain

Another factor to consider in positioning a service is the set of opportunities in the supply chain. For example, a digital service that empowers departments to track their office supplies and order items as needed from established vendors is appropriate for a firm that is trying to improve its inventory management and supplier relationships. The effectiveness of such a service is then measured based on its ability to streamline procurement processes and improve departmental autonomy in purchasing decisions. In Kay's Originals, a digital service that allows artists to monitor their own artwork inventory and alter their prices can help the art store streamline its artwork inventory, reduce its procurement costs, and improve its relationship with the artist.

Sometimes a digital service designed for one side of the value chain can have benefits in internal operations and either demand or supply chain activities. Such a wider recognition of the impact is valuable in effective positioning of a service. For example, a digital service that captures a manufacturing firm's prior responses to requests for quotations (RFQs) can help increase the speed with which the firm can respond to future RFQs (demand chain value). It may also be used to reduce errors in quotations (leading to operational cost reductions) and possibly predict internal and external resource needs used for engineering and design (supply chain service procurement). Of course, such a wider impact requires stronger business commitment, as effective use of this service to realize all these benefits requires a willingness of multiple departments to capture and share knowledge for effective reuse.

Each of these examples illustrates how positioning a digital service within a customer firm requires a careful understanding not only of what your service does effectively, but also which part of the customer firm's activities you are trying to influence and what the associated value of the digital service is. At the same time, introducing a digital service into an ill-prepared organizational environment can lead to implementation failure. No matter how committed senior management is to bring a digital service into the organization, you need to be aware of all the operations that will be impacted by the service. Instead of waiting for the actual implantation, anticipating some of the implementation challenges during positioning might lead you to not only articulate the value of your services carefully, but also make the organization aware of the challenges it may face in realizing this value. In fact, it may be helpful if you can identify a few services that are an easier fit and can showcase the value of the service, while buying time to support any organizational change. Going back to the patient room robot services, hospitals may not be ready to implement all the services to realize the full value quickly. Therefore, services such as lab test scheduling, pain management, and dietary support may be best to showcase value if there is the right culture and visible support. However, hospitals struggling with length of stay may prefer lab test scheduling as it has direct implications on costs and may only need minor changes to a few current departmental processes.

The discussion on positioning a digital service thus far has focused on a business customer and the customer's activities along the value chain. If you are to position your digital service in the right way to demonstrate its value, it is important for you to understand the firm's value chain activities, its decision making-process on digitization investments, and its preparedness to

transform itself to address customer demands. Knowing what you like to offer in value is not sufficient, as it needs to provide value to a business customer. The customer should be aware of the impact of the digital service on the business operations and may need to address changes needed to support any business transformation to realize the full value of the digital service. The same principle applies when it comes to positioning the product to the individual consumer, which is discussed next.

8.3 Individual Consumer

However digitally-driven and mobile they are, customers are still social creatures and for the most part depend on others to help them decide what to buy, when to buy, how to buy, etc. Customers look at reviews of what others are buying before they buy things (e.g. they prefer others' viewpoints). They look at who else is offering before selecting a product from a given firm (e.g. they want to make sure they are getting a great deal). They look for certain times to buy things because that is when others like to buy things (e.g. they follow implicit habits like buying before holidays, post holidays, on-line, etc.). More importantly, customers often buy things in bundles (e.g. multiple items) at certain times (e.g. based on work and other habits), and often at random (e.g. because they remember a need and not because they are compulsive).

In general, a customer's decision-making process to purchase a service (or product) has no well-defined value chain like a firm that takes some form of raw input and crates value to meet another's needs. Customers often purchase things to address their own immediate need or pain (books to read, pills for pain, shows to entertain, furniture for comfort, gadgets to help with cooking and household chores, etc.), and digital services that can help them do these things "better" are always evaluated with these goals in mind. For example, ready-made food delivered to the home, on-line purchase of items, digital devices to talk to and do things, etc. are all supporting some current needs more conveniently. One can view these, in the language of value chain, as improvements in customers' daily "operations," and any reduction of stress/effort (e.g. cost/time) is the focus of many customer innovations.

The customer value chain becomes complicated when it starts to serve not one but many customers clustered together (family members), as some of the operations are now supporting a group with varied expectations. Digital services that support a group - an entity associated with an individual (e.g. a house, automobile, and gadgets that are used by several members of the family) - or an event (family vacation, household food purchases, etc.) need to consider the "group decision making" process. Digital services that support groups need to know who makes the decision and how are these decisions are made (factors considered and how they are traded-off against each other). Some decisions need to use a longer time in value assessment (e.g. house-related services), and some are one-time decisions that need to show quick value (e.g. vacation-related services). For example, a digital service that supports a family visiting an amusement park (with information on line length, delays on rides, etc.) has a one-time value, while digital services that monitor a house for security and provide alerts tend to show value over a longer time. When positioning a service to realize value over a longer time or one-time, it may be necessary to use different approaches to showcase value and, in some cases, how the customers are charged (e.g. one time purchase or subscription price).

Some of the customer purchases are for other customers (e.g. giving gifts, providing a cleaning or marketing service, etc.), for members of the family (e.g. support education), or for

themselves or others in the future (e.g. retirement, health prevention, etc.). Digital services developed to help family members buy gifts for others, help with career choices and school selection, evaluate investment options, select gyms at which to work out when they travel, etc. are all important services. However, positioning these services for value creation becomes harder as the benefits associated with some of these are often "wishes" or "likes to have," vis-à-vis a "pain or a stress" that is persistent. Therefore, positioning these services not to a single customer but to an institution that the customers rely on to provide such services may be helpful. Such institutions could include a gift store, colleges/guidance counselor at a university, financial advisors, or health care facilities. These institutions can leverage these digital services as value added services to their members. In a way, you are taking a digital service designed for a single customer and selling it to an organization that has many such customers. This allows you to offer a portfolio of services to a diverse group of customers without wondering about their individual decision process, since their association with the customer group implicitly says what the members are looking for.

Customers also have a supply chain, and this includes suppliers that individual customers use to gain value or reduce their effort (and possibly the cost and time). These can include suppliers that help build and maintain homes, employ the customer to earn a living (even though we don't often think of our employer as a supplier), treat them when they are sick (hospitals), etc. While these can often be potential business customers of the digital services we designed for an individual customer (e.g. wrist-worn devices that send alerts when a person is sick or under a threat can be sold to hospitals or house security firms), the customer-supplier relationship can still be analyzed for value assessment. For example,

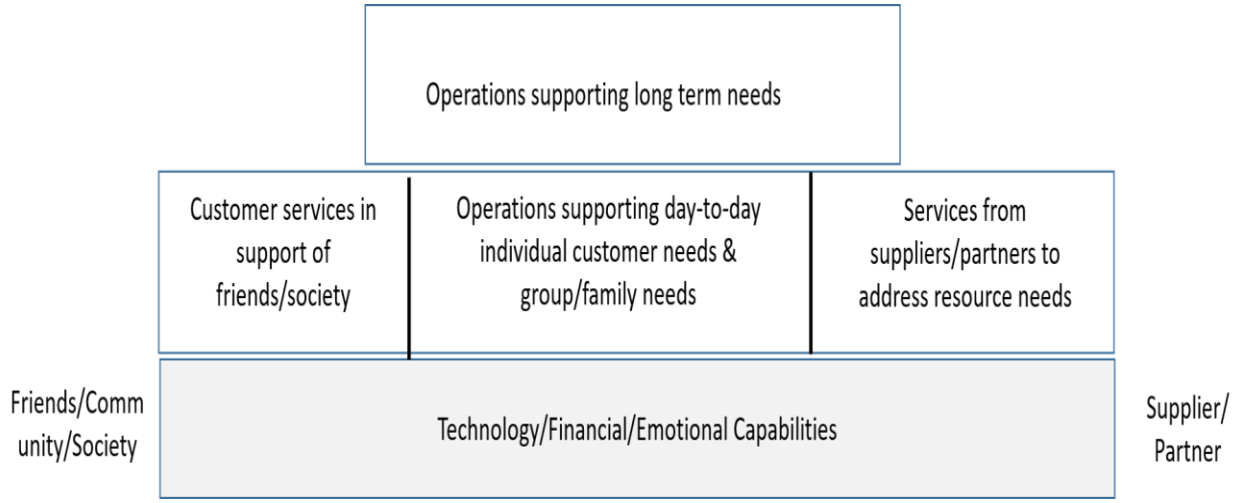
- a digital service that helps an individual customer explore career choices may be most attractive to those who have a stressful relationship with their current employers;
- a digital service that helps patients maintain control over their health records may be attractive for those customers who travel a lot due to job-related reasons and have to visit many hospitals;
- a digital service that provides alerts using a wrist-worn device may be useful for those who house sick and elderly parents or kids with special needs; and
- a digital service that helps locate house repair/maintenance people is useful to those who like to refurbish homes.

Figure 8.4 provides a template for looking at customer decision process and activities along the customer value chain. While this is just one way to represent the supply, demand, and operational parts of a customer value chain, the decisions a customer makes can be used to address their own needs (reduce stress/pain or satisfy a desire/wish), or the needs of their family, which involves a synthesis of many in the group. Given the number of digital services that are being developed to support customer needs, the technological maturity or capability of the individual also plays an important role in how well the digital service is designed and positioned. For example, digital services developed for a millennial have a different focus than for those who are in their retirement age and have not grown up with many social media technologies for seeking assistance when systems fail. The financial and emotional capabilities also have a bearing on how effectively a digital service needs to price itself to gain entry into the customer market and interact with customers for sustained value (e.g. technology needs to be forgiving when it is provided to customers under stress, or less sophisticated in the way services are delivered).

In summary, understanding a customer value chain (customers, operations, and suppliers) can be useful in positioning digital services to generate specific value that addresses an immediate

or long term need, current or future need, or individual or group need. Positioning is more about understanding how customers (either an individual or firms) views the digital service and where it fits into their value chain. This view helps us assess the value of the service, and it may change depending on the customer segment. Such a customer segmentation is not using a firm-centric view (loyal or new, large volume buyer or an infrequent small volume buyer), but a customer-centric view (addresses customers' operations, supply chain, demand chain; and their costs, comfort/convenience, wishes, etc.). This will help us determine the strategy to use, and this is discussed in Chapter 9.

Figure 8.4. Customer value chain



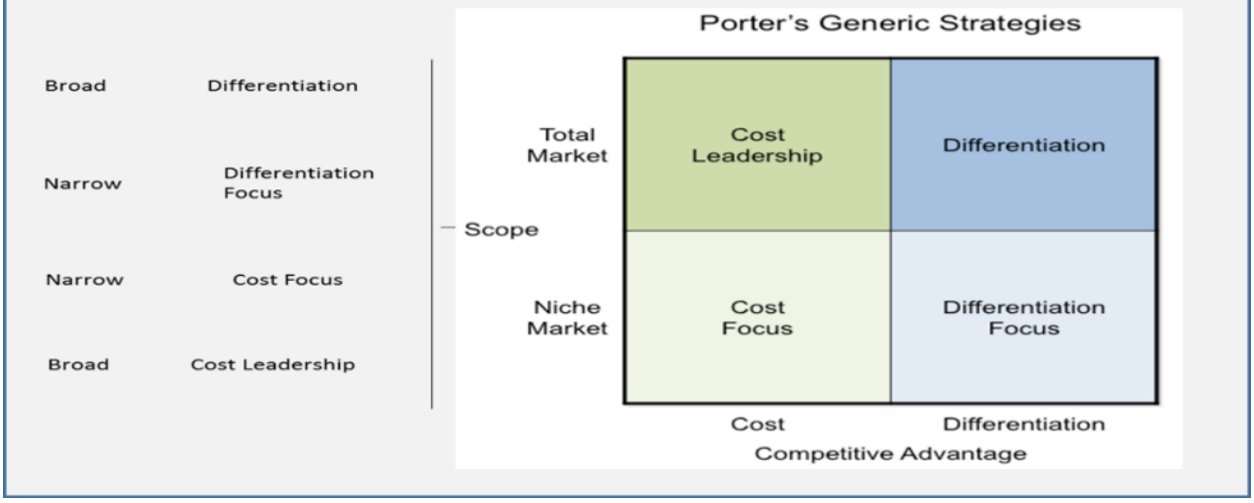
Chapter 9 Strategy

In the previous chapter, we discussed how the data generated from digital services and other customer interactions is used to either generate new services or re-position current services to address evolving customer expectations. In this chapter, we will look at how digital services, as a part of an organizational strategy, must be aligned with or address the customer's strategy. In other words, how do we make the digital services support the customer's competitive strategy.

Figure 9.1 maps the two-by-two framework of Porter's competitive strategies [Porter, 1985] (shown on the right) along the continuum on the left – with "differentiation" and "cost leadership" at each end of the continuum, and with "focused cost" and "focused differentiation" being a part of this continuum.

Organizations compete either as cost leaders by continuing to reduce costs or continue as differentiators by focusing on factors other than cost. When we think of cost leaders, we may think of Southwest for air travel and Walmart for shopping. Similarly, when we think of Starbucks or Lexus, we view them as differentiators of customer experience in coffee consumption and automotive travel. However, firms that traditionally compete on costs or differentiation may look for niche markets to shift their focus to differentiation or cost. For example, a bank that competes on low cost investment advisory services may provide a niche group of wealthy consumers with a full-fledged investment and trust advisory service (focused differentiation). Similarly, Amazon, which differentiates itself by providing fast on-line delivery of multiple purchases might provide a niche service to cost-conscious customers (low cost shipping or a limited set of services to prime members (Focused cost).

Figure 9.1 Alternative representation of competitive strategies

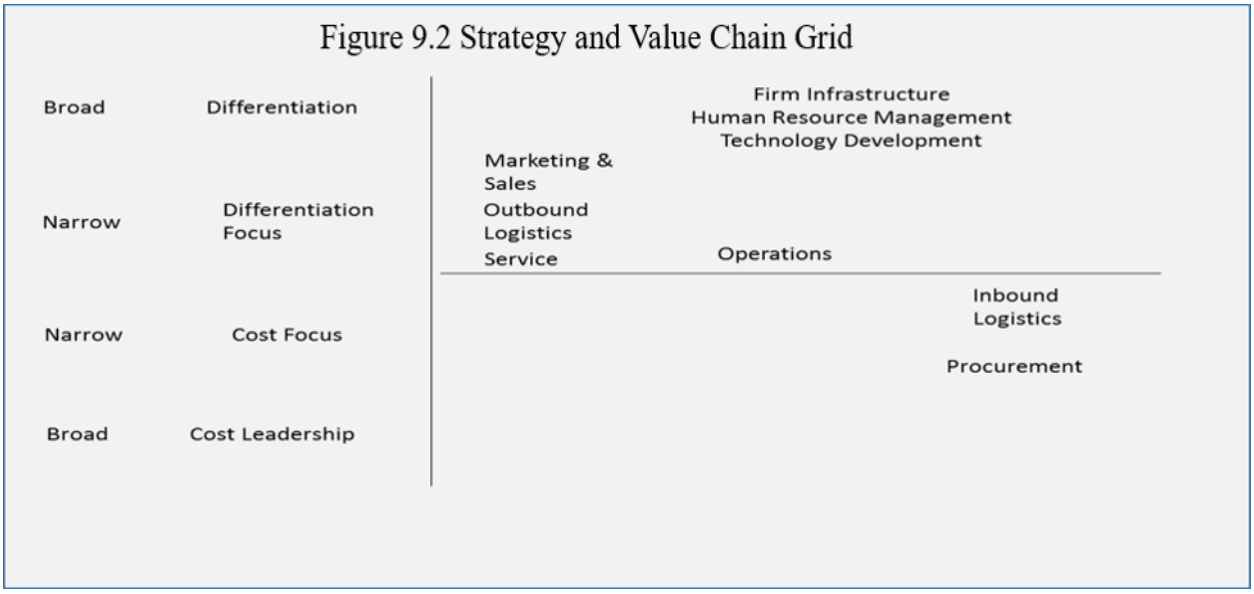


The digital services designed to support the value chain activities of business or individual customers should also support the competitive strategies of these customers. For example, if the digital service is to reduce cost to a customer (e.g. a shopping App that downloads coupons for select items), then a cost-focused retail store (business consumer) might view this service favorably, as it is aligned with that consumer's strategy. On the other hand, a digital service that provides mobile access to food products for either home delivery or quick pick-up at the store is more aligned with a grocery store that is looking for differentiation or focused differentiation in the eyes of its customers. The same is true for individual consumers who are looking to manage their financial budget by reducing their food cost or seek shopping convenience.

In Figure 9.2 below, we position the revised Porter's Value Chain along the X-Axis and the strategy continuum along the Y-Axis. The "demand side" focuses on customer interfacing activities (marketing/sales, outbound logistics, and after-sale services), and the "supply side" focuses on supplier/partner interfacing activities (inbound logistics and procurement), with a firm's value added activities (operations) in the middle. Other activities such as technology, administration, and human resource management in Porter's value chain are shown as supporting all of the firm's primary activities.

Business consumers with a "differentiation" strategy constantly looks to digital services that create new value, and those with a "cost leadership" strategy look to continually improve their internal cost structure and work with suppliers to reduce their supply chain costs. Firms with a focus on differentiation start from the "demand chain" and look to understand customer decision processes (marketing), learn to effectively communicate the value of their services (sales), deliver these services conveniently (distribution), and support them effectively after sale (service).

Figure 9.2 Strategy and Value Chain Grid



Any digital service that supports demand chain activities will be attractive to business consumers using a differentiation strategy. For example, a digital service that helps international students select restaurants or apartments based on their taste and residential needs may be attractive

to institutions who are looking to provide differentiated service that is globally friendly. On the other hand, a digital service that tracks shipping containers of raw materials or tracks how long the materials are on these containers may be attractive to consumers interested in reducing costs attributed to lost sales or spoilage. Of course, digital services associated with a customer's internal operations may also support both these strategies. For example, the patient room robot that can help manage lab scheduling and reduce patient length of stay is attractive to a cost-conscious hospital, and wrist-worn devices that monitor a patient's condition post-discharge can support both a focused cost strategy (e.g. reducing reduce readmission costs) and focused differentiation strategy (e.g. attracting patients and physicians interested in continuity of care).

9.1 Business Customer Strategy

Figure 9.3 provides a revised framework that connects the business strategy with a firm's value chain. Here, the demand chain focus is engaging consumers in co-creating value propositions that can help address their decision-making needs, often using social media-based communication tools and discussion forums. Similarly, the supply chain focus calls for the co-production of goods/services in engagement with suppliers and partners, often to drive down the supply chain costs.

Engaging either customers or suppliers/partners in the design of services can often lead them to shift their competitive strategy. For example, as you engage an institution in developing a digital service that finds accommodations and restaurants to support its differentiation strategy (globally friendly campus), the institution may realize (or you may point out to them) that international students also need funding support. This may lead the institution to work with you in developing a digital service that supports their focused cost strategy, e.g., identifying students with a strong academic record and validating these records for scholarships. Similarly, engaging suppliers and partners in supply chain cost reduction in support of a cost-conscious consumer may lead you to discover an opportunity to develop a digital service that will make the firm consider focused differentiation. For example, suppose you are developing a digital service to help an office product business reduce its costs by having their suppliers manage their printer cartridge inventory, and you discover that a variation of the digital service can be used to help the office product business to change its business strategy for some of its customers. By providing the new digital service to its large customers like universities and allow them to track their own printers and cartridge inventory, the office product business can provide a value-added service such as faster delivery of printer cartridges by directly connecting its cartridge suppliers with large consumers. In other words, a digital service that is intended to support a customers' competitive strategy may lead to altering their strategy in support of a new market segment. Engaging customer or suppliers/partners in co-creating value or co-producing product/service to reduce costs need not always lead to simply reinforcing current strategy, but can often help discover opportunities to span the strategic boundaries (cost to focused value or vice-versa) and even transform their business models.

Figure 9.3 A Strategy Value Chain Grid

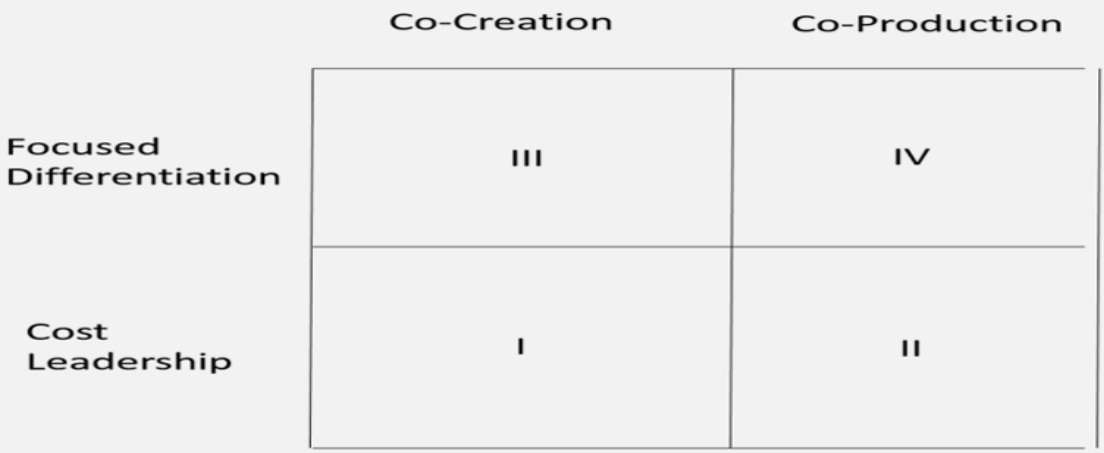


Figure 9.4 illustrates several examples of digital services intended to help a business consumer address their demand or supply side value chain in support of their competitive strategy. Note that each of these customer or supplier engagements can lead to various strategies and possibly expand their business models. For example, the digital service designed to support a pharmacy help its senior customers as a part of its differentiation strategy may lead to creating a focused cost strategy for seniors at a nursing home or independent living facility using their relationships with generic drug suppliers. Similarly, a digital service around a wrist-worn device designed to reduce the readmission costs of patients and support the cost reducing strategy for a hospital may lead to a new digital service that helps consumers use such a device to manage their own medical conditions, thus providing a focused differentiation to that hospital. Of course, your competitive strategy takes center stage and becomes highly visible when you provide digital services to individual consumers, and this is discussed next.

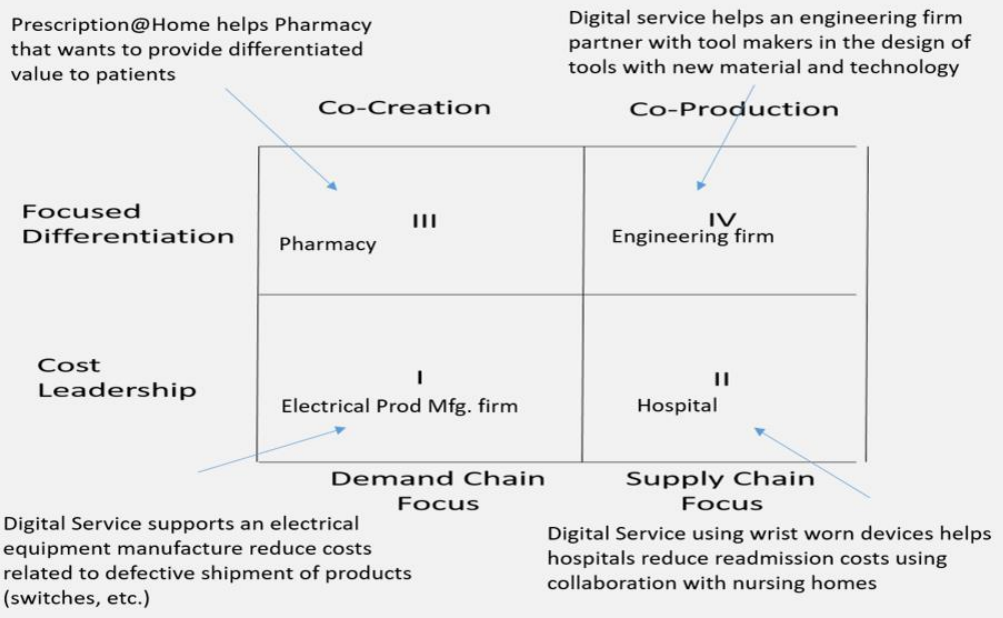
9.2 Individual Consumer Strategy

Individual customers do not have a competitive strategy, but rather have a strategy to gain utility from the product/service they purchase. Innovation literature discusses several factors people use to buy products/services and/or their willingness to adopt them. These factors include: relative advantage, compatibility, ease of use, result demonstrability, image/visibility, voluntariness, and trialability. Consumers look to see how the digital services you offer compare to those offered by your competitors. While not all customer strategies can be categorized along cost or differentiation, some are certainly looking to gain value through cost-based advantages while others are looking for novelty or image/visibility. If Apple brings a new product/service that is unique and charges a high price, people buy it for the novelty/image based differentiation.

On the other hand, a firm that is selling a commodity based product (whether it is airline travel or rental car), customers are viewing it from a cost perspective (does it cost me to carry a bag or do I get unlimited mileage?) or realize some form of convenience (is it easy to check-in/check-out?).

It is hence useful to establish for yourself, as a developer of a digital service, how you want to compete or be viewed in the eyes of a customer. If you compete on cost, then you need to have an organizational structure and culture that will continue to drive down the cost of your operations through internal efficiencies and reduce your supply chain cost structure. On the other hand, if you want to compete on differentiation, then you need an organizational culture that will build and sustain an organizational capacity to continually innovate to meet evolving customer expectations. Either way, your organizational structure and the way you interact with your employees and external partners/suppliers will depend on your competitive strategy. This will be discussed in the next chapter. To summarize steps 6 and 7, let us look at the customer complaint service system discussed earlier.

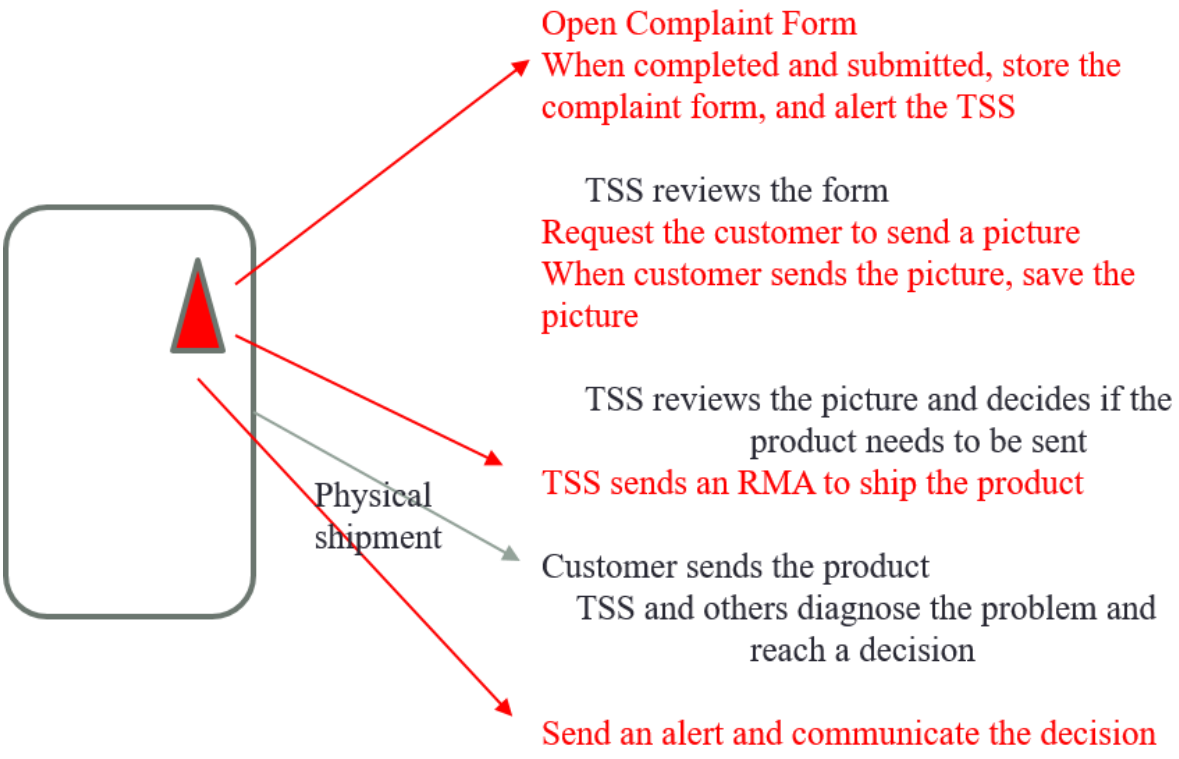
Figure 9.4 Positioning a Digital Service in Support of an Organization's Strategy



9.3 Overview of Customer Complaint System – Positioning and Strategy

Case Review: The firm produces a number of electrical goods that are shipped to major distributors, retailers, and sometimes to individual customers. The customer may have several issues with the shipment of the product, such as damaged in the shipment, wrong product shipped, the product shipped doesn't work, etc. The firm normally sends a customer complaint form (CCF) when requested by the customer to fill in and send it to a technical support specialist (TSS), who checks the form for completeness, determines the plant that manufactures the product, and sends the form to the appropriate plant product complaint coordinator (PPCC). If needed, the TSS may ask the customer service coordinator (CSC) to send an RMA number to ship the product to the plant for detailed diagnosis. In either case, PPCC and TSS works with engineering and manufacturing personnel to diagnose the problem. Based on this diagnosis, a decision (rebate, replacement or no action) is made and CSC communicates this decision to the customer with appropriate rationale.

Below are customer service encounters and processes/work-flows that are supported through digitization (in red color). Those in the black are left as they are today, supported by human interaction and decision making.



Key digital services

Automated customer interactions for managing customer complaints related to product shipment

Features include: filling a form; sending a picture of the product; receiving shipment # for product shipment; and receiving alerts related to decisions on complaint resolution

Knowledge capture of product diagnosis decisions

Customer complaints by customer category; product category; shipment related; other

Decision rules used to make preliminary decision on resolution (rebate, reship or none)

Decision rules that led to detailed investigation

Positioning these digital services – to support business customer's customer

Current customer and current market – improve customer satisfaction and loyalty

Current customer and new market – can the knowledge on preliminary diagnosis be used for provide unique services to loyal customers – automatic request for reshipment or rebate, or even fix the problem if it relates to product defect?

Can the knowledge base be used as "product expertise" and provided as a service to others who are servicing such products, especially if they are related to products?

Can this help expand the service to new markets – international by leveraging stored knowledge to either support self-diagnosis or create knowledge intermediaries in these markets?

Positioning these digital services – to support business customer's operations

Using complaint related knowledge on products, shipments, or compatibility/style etc., CCS can

Improve product design/engineering

Improve shipment processes and better partnership with shipping vendors

Customer segmentation for providing premium value added services to those who need products with style and compatible with home or office architecture – customized design of electrical appliances or products

While some of these support current customers and current products through greater efficiency and effectiveness, other specialized services may be used to support current customers with new "services," or expand the customer based expanding the firm's reach (to international markets).

Strategy

Given that digital services defined here can support either differentiation or cost reduction, the focus is on how best do these services align with the customer's strategy?

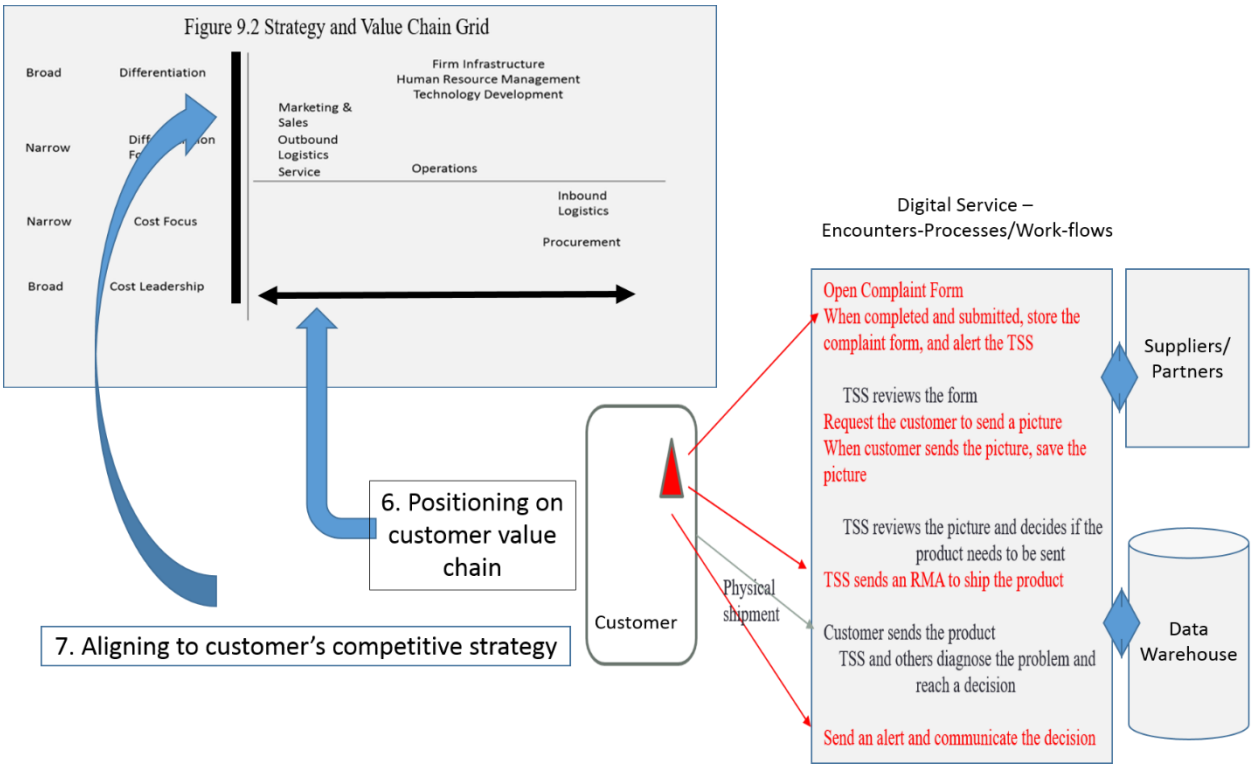
If the firm is focused on minimizing customer losses due to its inability to address their complaints quickly, each of these digital services can be used either to reduce costs (cost avoidance due to lost customers) or to improve customer satisfaction for a firm that is competing on low margins.

If the firm can use the resulting knowledge base on product complaints as a repository and make it available for customers to self-diagnose, then it can be viewed as focused differentiation for certain large customers with technical staff.

As indicated under positioning, the knowledge base of product diagnosis itself can be offered as a new "service product" for individual electrical contractors or repair technicians and this may be viewed by them as a "differentiator."

So, it is a matter of how the customer views this service and the value it provides.

This orientation on to customer's value chain and strategy grid is shown below.



10. Structure and Partnerships

To run any organization, management should identify those who will fill various managerial and operational positions and what their roles and responsibilities will be. While capital needed and raw material or sub-assemblies used to produce products or deliver services is critical, the focus in this chapter will be on the human resources used to support various activities identified to fulfill the services goals. Some of the activities will be done by the organization and others by external stakeholders. These external stakeholders can be either suppliers or partners, and these two play different roles in support of the organization.

One of the first decisions a digital service developer needs to make is: Is it customizing the digital service to each customer or is it developing a digital service to the broader customer market, business or individual? If it is a customized digital service to support a business customer, then the task is relatively well defined, as the business customer defines the digital service requirements. For example, Prescription@Home designed for a specific pharmacy or a patient room robot designed for a given hospital will lead to defining appropriate customer service encounters and the automation they want to see. In this chapter, we will assume that the digital service is not customized, i.e. designed as a viable product for either a business or individual consumer.

Without customization, the digital service should try to meet the general needs of business or individual customers. These general needs for the digital service are identified with the customer value proposition or the innovation (Step 1) and how the customer interacts with the digital service to receive this value (Step 2). The rest of the steps beginning with processes and work-flows (Step 3) and automation and data analysis (Steps 4 and 5) to positioning and strategy (Steps 6 and 7) and risk management and implementation (Steps 9 and 10) all define both operational and managerial activities needed to design the digital service for the customer. Before we discuss how these activities differ for business and individual customers, let us define what we mean by structure.

Typically, structure refers to an organizational chart that describes the roles and responsibilities of various individuals working in an organization and who they report to. From a customer's view point, how an organization structures its roles and responsibilities and who reports to who are not as important as having a "team" of individuals design and deliver digital services to generate value. This team can be a single unit within an organization, an entrepreneurial firm, a mix of multiple organizations, or any other combination. The goal of the team is to perform various steps discussed above to deliver value to the customer. Prior research in virtual or global teams has shown that team structure is dependent on task at hand, skills/experiences of the team, and technology used to support coordination and collaboration among team members (see Appendix 10.1). We will use some of these dependencies as we define the team structure needed to support digital service design and delivery for either business and individual customers.

10.1 Business and Individual Consumer

Businesses that compete on cost use an organizational structure and culture that continue to reduce costs through operational efficiencies and effective supply chain management. On the other hand, businesses that compete on differentiation use a structure and culture that build and sustain a capacity to innovate to address evolving customer expectations. Either way, the business

customer's organizational structure defines the roles and responsibilities of its employees, and how they leverage internal and external supplier or partner resources to compete. These customers use digital services to support the way they want compete in the marketplace. Therefore, the team that is developing the digital service needs to understand the task at hand: Is the digital service supporting the business customer's cost or differentiation goals? For example, Prescription@Home may support a pharmacy's cost focused needs (improve its operational efficiency or reduce patients' drug costs) or it may support a pharmacy's need to differentiate its home delivery service from others. Depending on the task (which strategy the pharmacy follows), the digital service team may configure the right services to address this task. If the digital service is to support an individual customer, then the task is to understand the focus on the individual customers' strategy – are they seeking an economic advantage, hoping for comfort and convenience, or looking to gain external visibility through the acquisition of the digital service?

In summary, while the digital service team may not change its internal structure of each customer, business or individual, it needs to tailor its capabilities to effectively address the task at hand – design and deliver digital services to meet customer expectations. The rest of the chapter reviews the capabilities needed of the team involved in meeting these expectations.

10.2 Task, Team and Technology

10.2.1 Task Related Capabilities

The task can vary along the "structure" continuum. The "high" task structure is easier to understand, streamline, decompose into sub-tasks, communicate the way the task is done, train others to do it, and more importantly to automate it. Also, it is easier to source it to external suppliers or partners, as deliverables are easier to measure. For example, the Presecription@Home service is supporting a "high" task structure of a pharmacy (e.g. collecting prescriptions, verifying prescriptions, determining insurance, delivering prescriptions, and collecting payments). This makes it easy for the digital service team to show the benefits of each service feature either on cost or differentiation dimension, and to design and deliver these services effectively.

On the other hand, the "low" task structure (often referred to semi to unstructured tasks) is more difficult to understand, de-compose, and automate. These tasks are implicitly knowledge intensive and are often used by firms to competitively differentiate themselves. For example, a patient room robot can be viewed as a semi-structured task, as some of the operations are structured enough to be supported through automation, even if they have some knowledge processing activities such as pain management, test management, etc. On the other hand, a digital service that allows an engineering firm to co-develop parts with suppliers using simpler tool designs, or a digital service that helps an electrical equipment firm let its consumers self-diagnose product defects are of "low" task structure. Developing digital services in support of semi- to low structure tasks calls for the use iterative approaches to help the team understand the task, discover the nuances of knowledge use, simplify and modularize the tasks when feasible, and use exploratory pilots to demonstrate value.

10.2.2 Skills/Experience related Capabilities

The skills of the team vary depending on whether it is in the design stage of the digital service (an operational activity) or delivering it to the customer (a managerial activity). For example, the Prescription@Home digital service design team may need people who can design mobile/web based communication used by seniors and have data analysis skills to gather insight into customer behavior, while the delivery team may need people with experience in pharmacy operations and logistics associated with prescription pick-up and delivery. Similarly, the design team for the patient robot needs wireless communication and database/scheduling software skills, while the delivery team needs system integration skills as the robot needs to work with hospital operations and technologies such as Electronic Medical Records. As we will discuss later, some of these skills may come from external partners such as PayPal to support payment services for prescriptions, while others may be retained internally as a core competency, such as insurance policy knowledge on how Medicare or Medicaid support seniors.

A complement to the skill component is the "experience." Relevant team experience means having the right mix of experiences (some with many years and some with few) to meet the task needs. While retaining right expertise is key, it is also useful to recognize that some of this experience may be contextual, i.e. needed to support a given customer engagement and not needed in the long run. For example, experience in 3-D printing to design a digital service for a global customer may be a one-time need, while data analytics experience is needed on an on-going basis to support the design and delivery of many digital services.

Also, the skills/experiences needed to design and deliver a digital service are different. The skills/experience needed to design a configurable digital service are different from what is needed to deliver a digital service to multiple business customer segments. For example, the patient room robot might be designed in a modular fashion to support certain services, but it might be sold to different businesses such as hospitals, nursing homes, and individual homes. The delivery team of a robot may need to integrate the some of the robot services with internal systems, when it is sold to a hospital, while it may provide it as a stand-along system for a nursing home. On the other hand, even a stand-alone system such as Prescription@Home may see variations in the way it needs to be delivered, as pharmacies may not be familiar with certain types of technologies (e.g. mobile based communication with customers). In other words, variations in the maturity of customers in their technology or their use may call for a team with a diverse set of skills/experiences in design and delivery.

10.2.3 Technology Capabilities

The third component is "technology." Given that the focus of the digital service team is on leveraging advanced digitization opportunities to discover and support customer expectations, the technology capabilities are very critical. However, the rapid pace with which technology is changing means staying current with technology will be a challenge. A web-based interface, mobile interface, sensor based alerts, etc. are all different technologies that can support a customer need, and these needs change with customer experience and as technologies matures. Thus, both the tasks supported by digital services and the skills/experiences needed among team members

change with changes in technology. While it is difficult to predict the future of technologies, it is useful to establish the potential sensitivity of tasks to technology evolution, so the team can develop its technology capabilities. For example, a team that develops smart bed technology that sends alerts to nurses when a fall risk patient tries to get off a bed needs to recognize that this technology will continue to evolve. Over time, this digital service must be integrated with Electronic Medical Records and may even need to use artificial intelligence to anticipate fall risk changes as the patient recovers, etc. On the other hand, teams that develop a digital service communication links between patients and nurses using text messages or alerts need to recognize that advances in communication technologies are not going to alter basic patient-nurse interaction for pain management, help with bathroom breaks, etc. Therefore, knowing how elastic a task is for future technological changes may help a team decide on the which types of skills/experience it needs to develop internally and retrain them, and which can be sourced or supplemented using partner resources.

In summary, the governing principles for the digital service "team" structure are

- Establish the task involved in the design and delivery of digital services
    - Identify design activities and delivery activities
    - Categorize these along the "structure to unstructured" continuum
- Establish the general skills/experience needed among team members
    - Identify skills/experiences needed to support design and delivery activities
    - Decide which of these skills/experiences should be internal and which can be sourced
- Establish technology experiences needed within the team
    - Identify the technology needs of the digital services, current and future
    - Decide which technology experiences are core competencies of the team

In summary, based on the task the digital service is intended to support:

    - Decide those design/delivery activities that are best done internally
    - Establish the team and technology skills/experiences
    - Develop external skills/experiences needed to supplement the team

One factor that should be considered in the distribution of tasks and associated skills/experiences between internal vis-à-vis external is the team's competitive strategy. The "team" (either as a part of an organizational unit or as an entrepreneurial entity) needs to develop its own strategy as a digital service developer. If it wants to pursue a "differentiation" strategy, it needs to nurture a culture of innovation among its team members and help them develop new skills to meet evolving customer needs faster than any competitor. Such a differentiator strategy calls on the team to develop an "entrepreneurial" mindset and be ready to exhibit a risk-taking behavior. On the other hand, a team that wants to pursue a "cost focused" strategy may focus on building a "lean" management approach to internal skill development and use external partners as and when new skills are needed. While a digital service team's competitive strategy need not be aligned with the competitive strategies of its customer, such alignment may help it deepen the value of its service offerings. For example, the team that develops the patient room robot, if it follows a differentiator strategy, may continue to innovate patient services using artificial intelligence, and

this may be aligned with a hospital that is looking to differentiate itself by creating value to its patients.

Given the importance of external stakeholder skills/experiences to a digital service team, the next section will further elaborate on the role of these stakeholders.

10.3 External Resources – Suppliers or Partners

Firms have used suppliers to complement their products and services throughout the evolution of commerce. In fact, businesses add value by taking raw material and pre-designed product components from suppliers and converting these into finished products for distribution to customers. If one were to look at all the resources needed to make a product or deliver a service, some part of this resource is provided by an external supplier and form a part of the supply chain. Of course, the more complex a product is (e.g. automotive or aircraft), the more complex its supply chain and larger the number of suppliers involved in the design and delivery of the various components needed to make the final product. The same is true for large service firms like banking and insurance industries with complex service offerings.

With many digital technologies influencing the way a consumer interfaces with businesses today, the number of technology suppliers have grown significantly. For example, mobile devices and communication technologies are used to support order fulfillment and tracking, and mobile apps are used for searching a hotel, playing a game with virtual players, or paying for a product/service. All these technologies and applications are provided by technology vendors/suppliers. Besides the technologies that connect businesses and consumers, other technology suppliers provide intermediate services such as storing data in a cloud, providing security, analyzing data, tracking sensors, and hosting websites. So, if one were to look at the technology resources needed to support a digital service, they include hardware and communication devices, application software, data storage and analytics, security, user interface, etc. and these are provided by many suppliers. The question for the team providing a digital service is: Which technology resources should the team develop internally and which should be provided by external stakeholders, suppliers, and partners? Before we answer this question, let us differentiate a supplier from a partner.

Supplier vis-à-vis a Partner

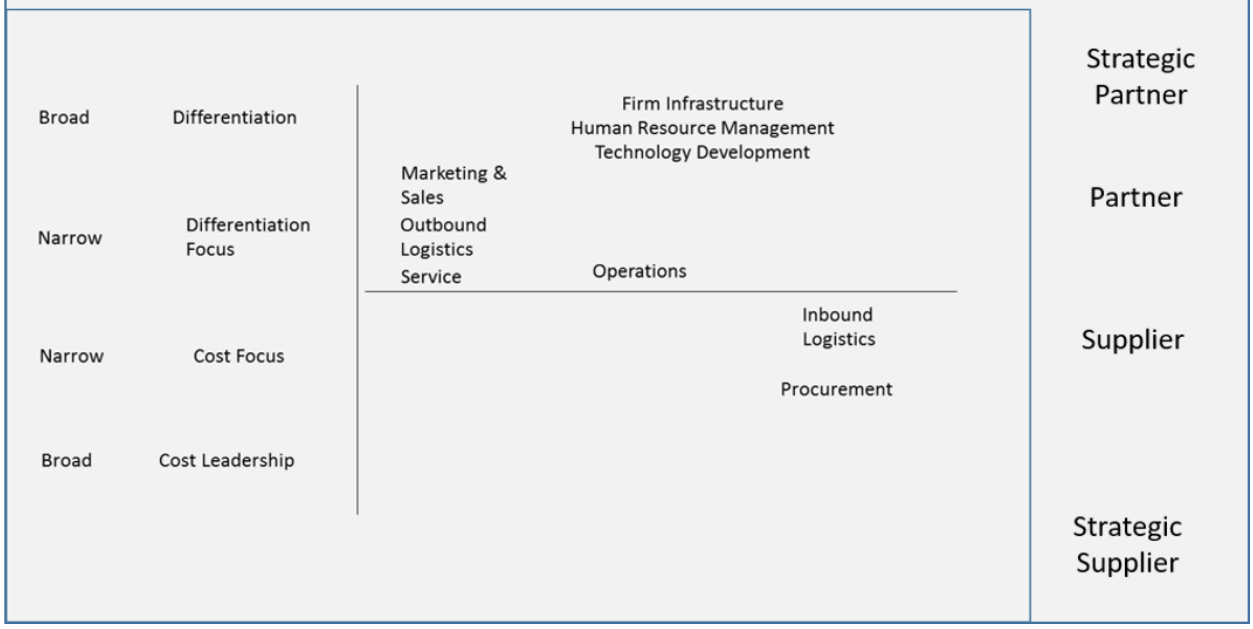
Imagine a firm making a computer. This firm needs many raw materials or sub-components, such as processor chips, console frames, fan and battery components, etc., and many of these are purchased from various suppliers. This is no different from an automobile manufacturer that requires seats, tires, engines, and other parts from various suppliers. In addition, the computer manufacturers may use other suppliers of products such as operating systems, device drives for the printer and mouse, etc., so that when the computer is sold, it becomes a usable product. The computer or notebook manufacturer may provide several options for the customer besides the computer. These may include a browser, office software, virus protection software, etc. Some of these may be standard and some may be optional. These are provided by various vendors such as Google, Microsoft, Nortel, etc. The question is: Are these considered suppliers or

partners? While they are suppliers to products which are sold to the customer as a single unit, they may be considered as partners when these are provided as options for customers to choose from.

At the extreme, every activity, digital or non-digital, can be done through partners, but it will be complex to manage. This is because the supplier of a service may view the customer as one who agrees to pay a price for that service and, in turn, the firm expects a certain quality of the product delivered at an agreed upon time. In other words, there is a contractual agreement and degree of certainty associated with a supplier-customer relationship, and each can commit their internal resource needs accordingly. On the other hand, partnerships are appropriate when there are options a firm would like to provide to its customers and these may be continually defined, refined and fine-tuned as the market needs change. Both firms and their partners understand the nature of this alliance, realize that there is value to be gained from shared knowledge and experiences, and have the option to break from these partnerships when shared value is not present. In other words, the partner relationship with a firm is flexible for both parties, whereas the supplier relationships are dictated by the nature of the agreed upon transaction.

In today's ever changing technology and competitive landscape, firms may consider some of their suppliers and partners as strategic in their ability to meet customer needs. For example, the interior design of a car is a differentiating feature for an automotive firm and it is constantly changing with the introduction of many communication and entertainment technologies within the automotive firm. Therefore, interior system manufacturers are strategic suppliers for an automotive firm, and many automotive firms co-design the interior with these suppliers and look to joint-partnership with technology suppliers for entertainment and navigation products. Similarly, firms such as Walmart may view some suppliers as strategic when customer tastes and demand are changing rapidly and allow these suppliers to manage the shop inventory not only to reduce inventory management costs but also ensure product availability. Similarly, a hospital that is trying to reduce patient falls using smart beds and address continuity of patient care using wrist monitors may consider the suppliers of smart beds and wrist monitors as strategic partners as they create differentiation among patients. Similarly, a shipping company that wants to ship goods on rail or trucks may partner with a sensor tracking digital service provider to reduce costs due to spoilage or damage to shipped goods. Again, the degree of strategic-ness of a supplier or partner depends on how closely their value adding resource i-s aligned with the competitive strategy of the firm. See Figure 10.1.

Figure 10.1 Strategy- Value Chain -External Stakeholder Framework



Note the positioning of the strategic supplier and strategic partner in alignment with the cost leadership and differentiation strategy. While this is not to imply that a strategic supplier cannot provide differentiation or a strategic partner cannot help reduce costs, firms use strategic suppliers in general to reduce costs of their supply chain including procurement costs and inventory management. For established business products/services, these become clearly defined and with the application of lean management concepts and the innovative tracking of supply inventory, costs can be reduced for firms that are intent on either cost leadership or focused cost reductions for certain market segments. Similarly, when firms are competing on differentiation by adding value, they may be looking to explore the use digital services to generate new value and agreements here tend to via partnerships.

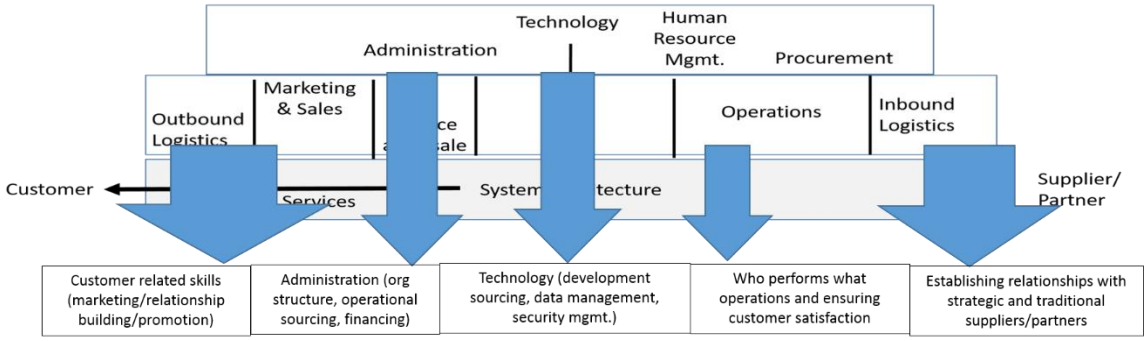
In general, flexible partnerships with external resource providers will allow both the firm and the partner an opportunity to evaluate the engagement of customers before committing their long-term resources. In fact, a strategic supplier can be a valuable strategic partner for some engagements when both are interested in evaluating a new market. For example, Lear (an automotive Interior supplier) is a strategic supplier for the automotive firm GM, but it can also be a valuable partner as GM explores customer interaction with other technology vendors of voice recognition devices that can adjust seat angles. Similarly, a strategic partner like Amazon that provides cloud services can help a frim reduce its cost of shipping a product by leveraging Amazon warehouses and their shipping expertise.

For a digital service team, using a mix of internal resources and external stakeholders, some as suppliers and others as partners, the decision is similar. How established is the customer market

and resource needs that it can commit to a contractual relationship with a supplier? For example, in the Prescription@Home digital service, the team needs to perform many activities: prescription collection, verification services, support prescription operations, delivery, and payment. If all these activities are needed to support its senior market segment, then it may decide to use an established supplier such as PayPal to manage payment services. On the other hand, if payment and delivery are provided as options to some seniors, then those who process payment or distribute prescriptions may be viewed as partners. Independent of whether a firm is considered a supplier or a partner, the team may use the data generated by them to learn more about the customer and use it to create new value. For example, if the digital service team provides Firefox as a browser option to check drug prices, it can partner with Firefox to see what customers are searching for and use this insight to develop generic drug option. Similarly, the team may use PayPal to find out when seniors pay or how they pay to develop niche payment options.

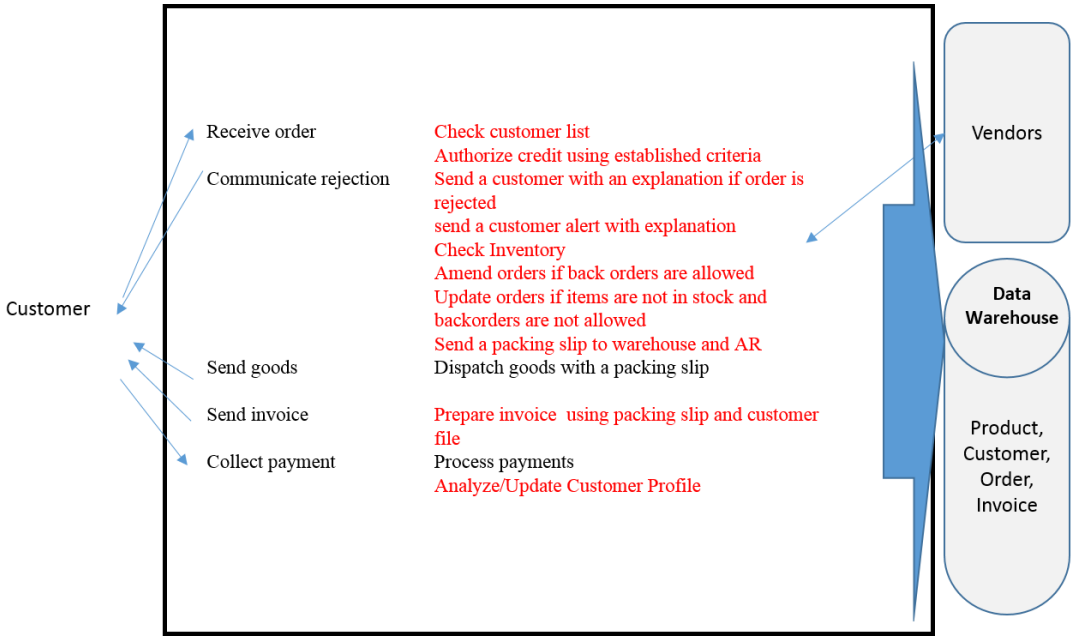
In summary, the goal of this chapter is to help structure the team involved in digital service design and delivery in support of its competitive strategy as well as supporting its customer's strategy by using a mix of its internal resource capabilities and external supplier/partner relationships. Figure 10.2 provides a quick summary of the skills needed to support various skill sets needed to support value chain activities, so a business can decide which will be done internally and which will be done externally.

Figure 10.2. Viewing Skills Needed along the Business Value Chain

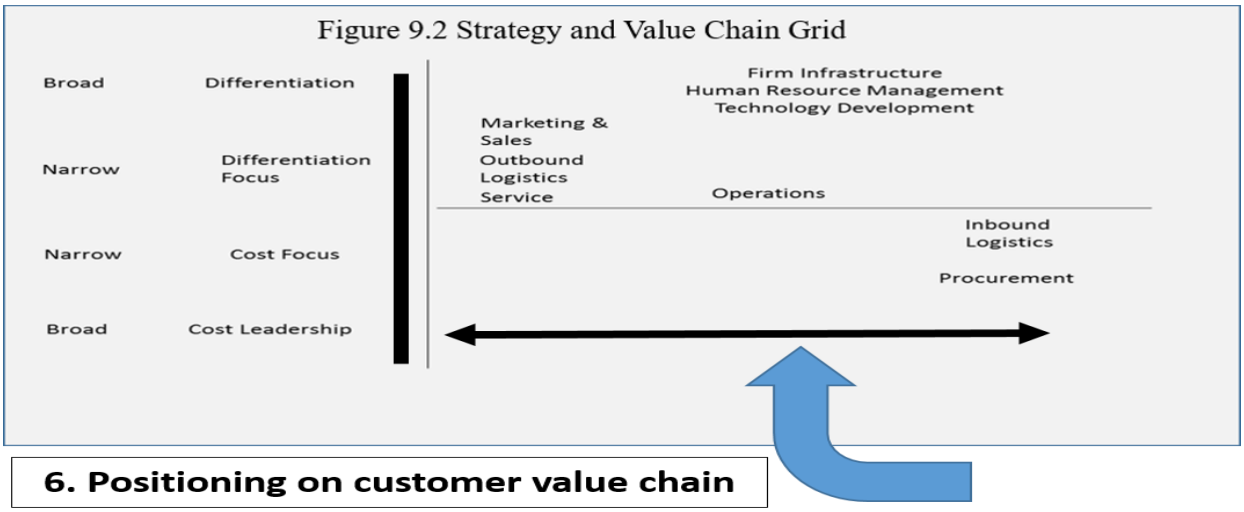


The next chapter will look at the risks associated with governing relationships between internal team members and external technology and non-technology suppliers and partners, and develop risk mitigation strategies. The rest of the chapter looks at DEC distributor we discussed in earlier chapters and see how a potential digital service supports steps 6, 7 and 8.

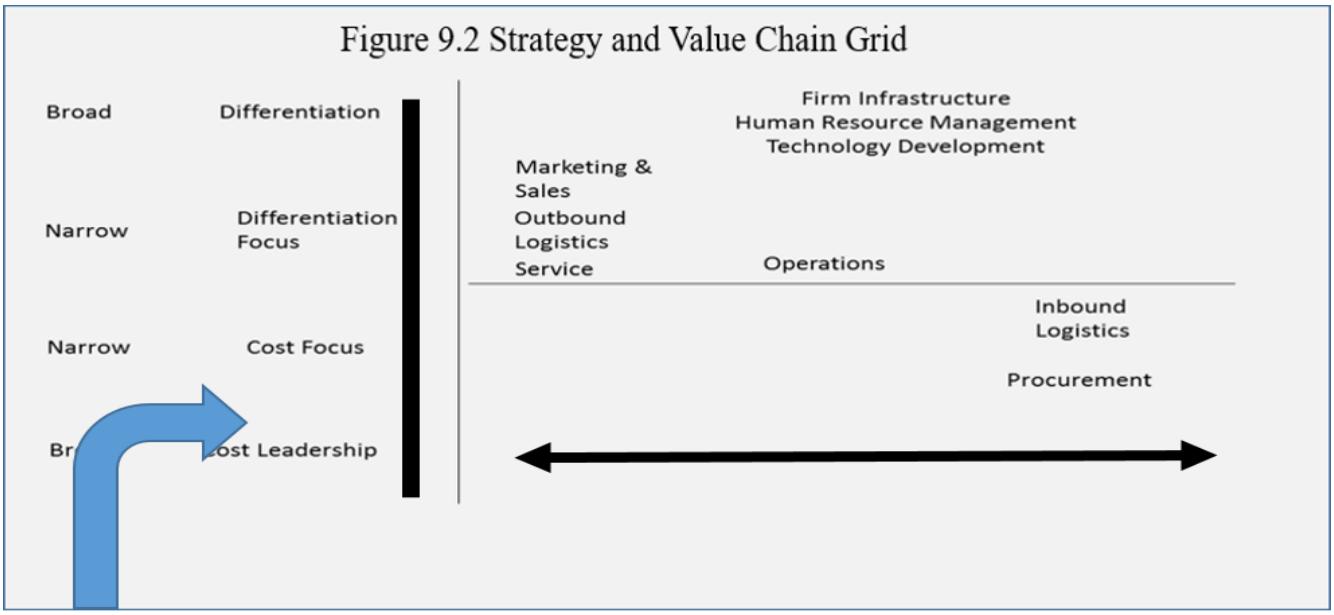
DEC Digital Service Configuration



DEC Positioning



Distributor will use the app to improve
operations - faster responsiveness to customer orders by reducing communication delays within the units, and also reduce paper work costs
Supply chain - better tracking of inventory and demand forecasts, so vendors can replenish stocks in an orderly manner
Customers –
- current market and new service - improve interaction with large customers by offering a new service that eliminates credit check and places backorder of items not in stock automatically
- new market and new service – walk in customers can order items using an app and pick up items in person (if items are in stock)



7. Alignment with customer strategy

Distributors tend to have low margins and want to reduce their operating and inventory management costs

- Align the app with customer's **focused cost** strategy

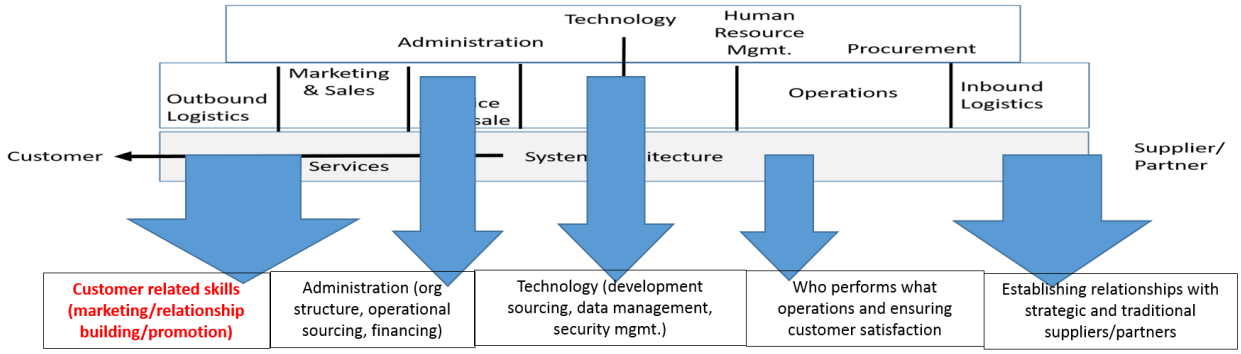
Distributors like to keep strong relationship with large customers (retailers, institutions that place large orders)

- Align the app for **focused differentiation** with large customers

Some distributors may want to connect with individual customers in the region by providing **unique differentiation** –

- Align the app to such differentiation by allowing customers to order items and pick them up at a facility near by

DEC Structure – Customer Interfacing



Marketing/Sales

Communication

- with distributors on cost saving in operations and inventory management through demonstration/trial version of the app for some time period

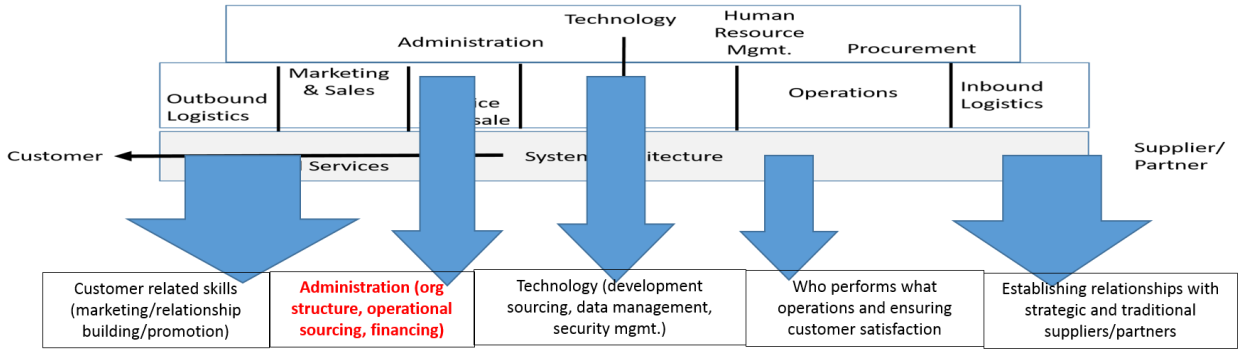
Interaction

- with large customers and sell them on the new service (no-credit check/automatic back ordering) – trial period to show the value

Exploration of new customers

- Work with distributors in contacting individual customers in the region to assess their demand for order-pick-up using an app

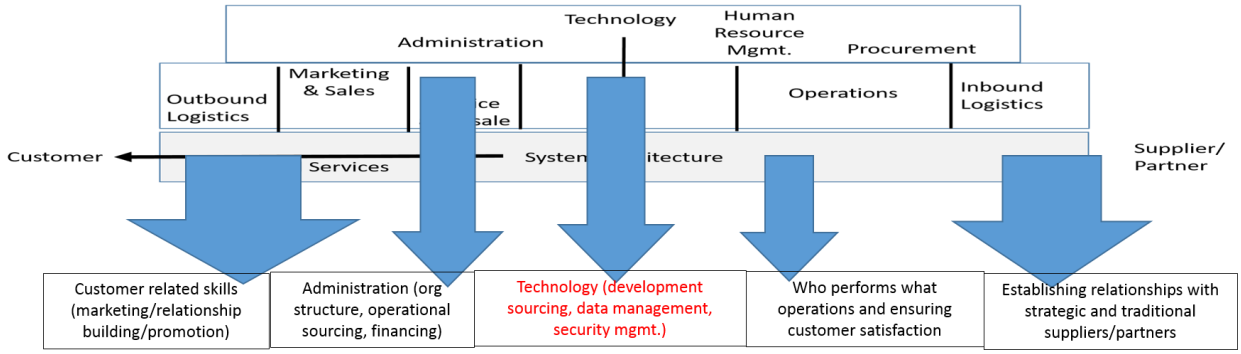
DEC Structure – Administration



Reorganize digital service business into groups along major customer service encounters

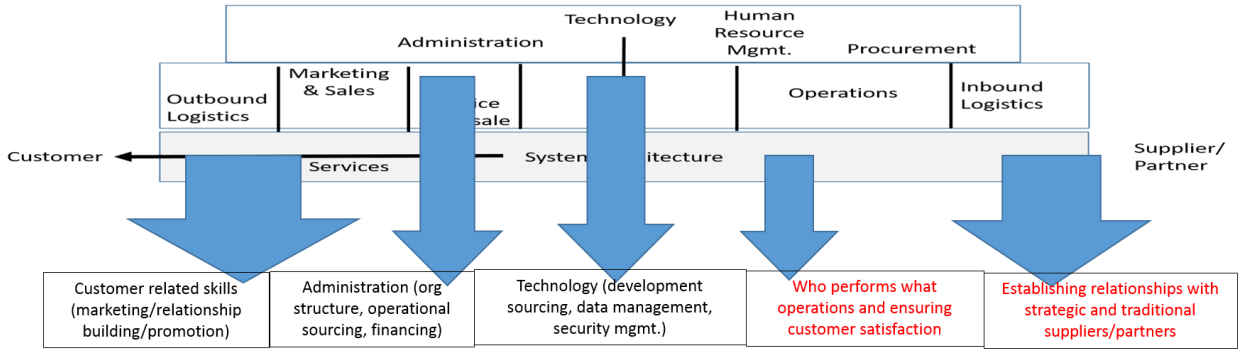
- order processing (order processing/credit monitoring and back order decision making)
- order fulfillment (dispatch, invoice and payment collection)
- inventory mgmt. (fill orders and back-order processing)
- AR management (credit and payment processing)
- Small order mgmt. (special group of customers ordering placing small orders)

DEC Structure – Technology



- Develop app to support all interfaces/encounters
  - use strategic partners to develop apps that talk to large customer systems and individual customers
- Develop app to meet internal processes
  - manage inventory, update customer credit and payment data
- Internal development
  - Use internal IT possibly or off-the-shelf software (purchased from outside) for critical processes (inv. Management for example)
  - Data analytics to analyze customer response and track product movement
- Partners for new or strategic applications
  - Small order/inventory data on cloud for easier access to customers
- Sourcing of routine tasks
  - Backup and security can be handled using partners or established vendors

DEC Structure - Operations



Marketing/Sales
– customer relationship/satisfaction
Operations staff
- Order processing
- Order fulfillment
- Inventory mgmt.
- Supplier relationship
Administrative staff
- Credit monitoring/payment process
- Data analytics
Special projects
-Special store for order/self-pick-up

11. Risk Management

Organizations have always recognized the risk of having to make decisions in an age of uncertainty. To support these decisions, decision models are constructed that incorporate both exogenous inputs of which businesses have limited or no control, and endogenous inputs that a business can influence through actions to influence its performance drivers. These models are then used to assess the sensitivity of performance goals or targets for changes in inputs. Ambiguity in the relationship between certain exogenous inputs and performance targets, as well as in the type of exogenous inputs that can potentially influence a business performance, will make it difficult to construct a decision model and will increase the decision-making complexity. This is often the case in today's business transformations, where competition can come from unexpected sources influenced by new technology innovations and changing customer experiences. In these cases, the most a business can do is to develop any number of alternative scenarios that can negatively influence business performance and assign probabilities for these scenarios, or else build a culture of agility within the business so that it can adapt quickly to market dynamics.

The digital service design and delivery discussions thus far have built in modularity to address business uncertainty and ambiguities. The deliberate customer-centric approach that we have used recognizes potential challenges to meeting evolving customer expectations by modularizing digital services around each service encounter. In addition, each step we have taken along the methodology allows the digital service firm or unit to look ahead and see the future consequences of actions taken within that step, and look back to make changes in the previous steps if needed. By making digital services configurable for evolving technologies (Step 4) as well as processes used to support service encounters (Step 3), these can be positioned to support alternative markets with varying competitive strategies (Steps 6 and 7). The agility built into the digital service design (Steps 2-5) and delivery (Steps 6-8) though modularity helps address uncertainties in decision making. Despite all this planning, not meeting expected goals is always a risk, and this chapter looks at how to categorize potential risks so that they can be addressed proactively.

Just as we have done throughout the book, let us look at the risks associated with uncertainty from the customer's viewpoint. What are the risks your digital service poses to business or individual customer, and how do you intend to mitigate these risks? The more you reduce customer uncertainty about your ability to meet their performance goals, the greater the opportunity for you to retain that customer's loyalty and indirectly address market-related uncertainties. Later, we will address some of the risks associated with your own business uncertainty.

11.1 Business and Individual Customers

Business customers use digital services to improve their operational efficiencies or decision making. They use these services to support their customers and differentiate themselves, or else to improve their supply chain and reduce costs. For example, a pharmacy may use Prescription@Home to reduce costs or support differentiation. The same is true of digital services provided by the patient room robot to support a hospital or a nursing home. A customer sees a risk when such a system fails to deliver what was promised. Failures are often categorized in security

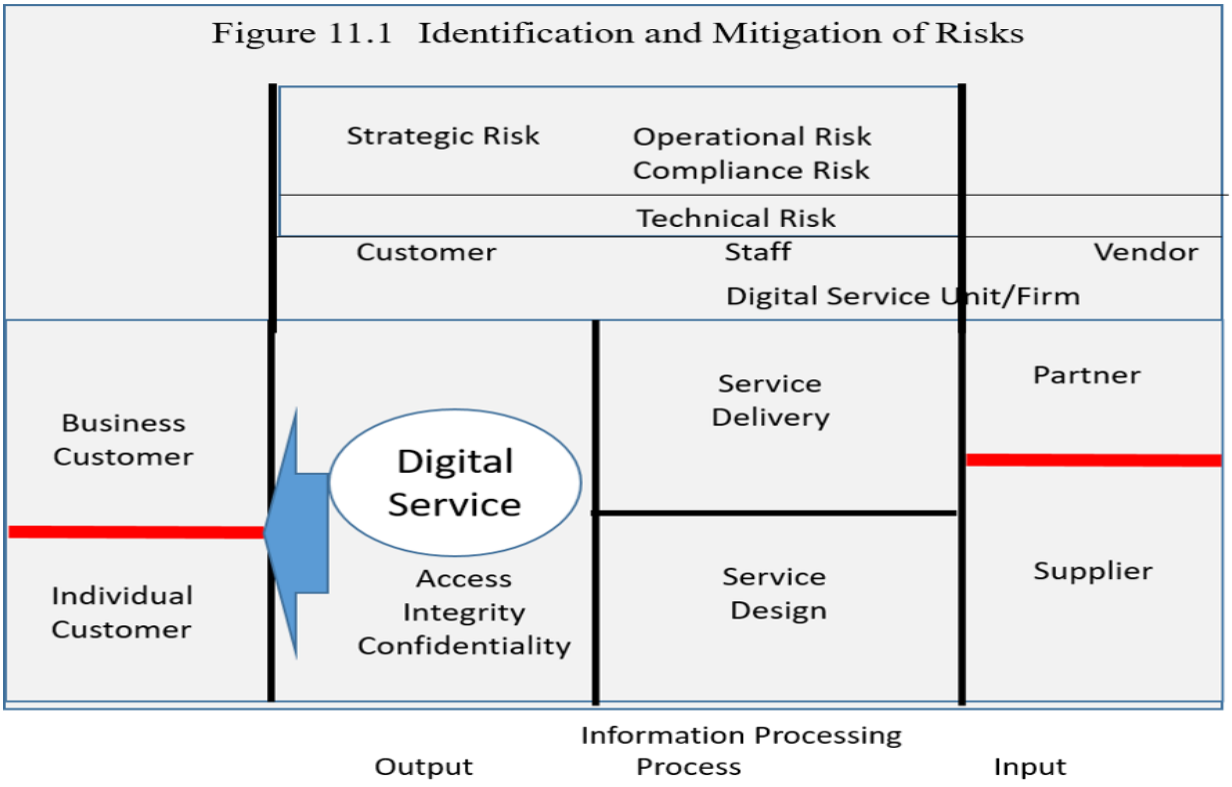
literature along three dimensions: confidentiality, integrity, and access. Does the proposed system manage all the data without negatively impacting privacy and security (confidentiality)? Does it process the data accurately and consistently (integrity)? And is it available when needed without disrupting business operations (access)? Viewing the digital service as an information processing value chain, CIA can be implicitly mapped to this information processing value chain: input with due respect to confidentiality; process that ensures integrity in operations; and output that respects the customer's need to have the information when they need it without interruption.

Business customers have addressed risks associated with information systems using both internal and external auditors to systematically identify potential problem areas (in any of these categories: confidentiality, integrity, or access). The firms develop strategies to prevent problems from occurring, and to detect and correct them when they do occur. Business customers with sophisticated IT capability can address some risks themselves, such as identifying possible tampering or misuse of data, improper changes to the data processing, and delays in getting the output to decision makers. Some of the approaches used include multiple layers of internal controls to prevent potential problems from occurring, transaction logs and sample test case scenarios to detect problems, and back-up and recovery processes to correct for errors in transactions. It is incumbent upon the digital service provider however to work with their business customers to make sure these risks can be addressed effectively.

When information systems remained within the organizational walls or in close contact with external stakeholders (technology or non-technology) through secure networks and communication channels, these risks could be managed effectively. Even when systems failed, they were handled with little external visibility. However, technologies in the 21st century extended organizational boundaries to external stakeholders using public networks and wireless communication channels. This makes the visibility of failure higher, and there are many more opportunities for threats from inside and outside the organization. Therefore, a deliberate strategy is needed to isolate areas within the business that can contribute to risk in any of the IS value chain categories (input, process, and output), detect risks when they happen, and correct them quickly before they contribute to significant business failure.

When digital services are provided to individual customers, addressing risks in any of these areas (misuse of confidential data, inaccurate processing of data, or not having the information available when needed) can have a significant impact on the customer's relationship with the digital service firm and the service provided. For example, an app that a customer uses to purchase online goods, if not available when needed, may have a negative impact on the digital service brand. Similarly, if the app collects confidential credit card information and is misused or hacked, it can have a significant impact on the firm's legal obligations. Therefore, the digital service firm is responsible for ensuring that these risks are managed carefully. Figure 11.1 categorizes the digital service firm's risks, and the rest of the chapter discusses how the firm may address these risks.

11.2 Risk Categorization



The risks are categorized along four dimensions as shown in Figure 11.1. Technical risk, while often driven by new technologies offered by vendors, is split across demand, operations, and supply chain. Operations risk and compliance risk are shown in the middle of the value chain, and they deal with human resources used in support of both the design and delivery of the services, as well as adherence to various security and governance protocols. Lastly, strategic risk is shown towards the demand side, as it is inherently focused on making sure that the reputation of the firm in the eyes of the customer is not damaged. As you will see, these risks can be overlapping in their impact on access, confidentiality, and integrity. For example, the use of a new unproven technology in developing a digital service can contribute to both a technical (integrity) risk and strategic (access) risk, and the use of external stakeholders in the design or delivery of a service can lead to both operational (integrity) as well as compliance (confidentiality) risk. Let us now look at each of these individual business risks.

Operational Risk

These risks cover both operational activities and managerial decisions. The operational activities are associated with the design of services to meet customer expectations and the implementation of these services at the customer site. They also involve interactions with the digital service suppliers/partners. The managerial decisions are related to activities involved in the structure and organization of the firm, as well as risk mitigation activities.

Operational Risk – Digital Service Team Perspective: Given the speed with which design and delivery may change to reflect evolving customer expectations, there is a need for an organizational culture that supports agility. Since agility is integrated into the way the digital services are designed and delivered to the market, it is critical for the organization to recruit and retain people to sustain this culture of agility. A part of this culture is a recognition that organizational capacity today requires a mix of internal and external resources to react quickly to support changes, and to align the firm as much as with the customer or supplier/partner culture.

Operational Risk – Customer View: Confidentiality and integrity calls call for careful consideration of customer data for privacy/security, and consistency in operations to ensure system integrity. Internal staff needs to follow privacy/security practices of the customers and make sure the speed and agility in designing systems does not compromise the need for system testing.

Technical Risk

Digital services are designed to leverage advanced digitization opportunities, and these digital services are integrated into the customer operations for effective implementation. While several of these technologies are developed by new vendors, their influence can span the entire value chain of the digital service business: customers, internal staff, and external suppliers/partners.

Technical Risk – Digital Service Team Perspective The newer the technology to the vendor community or the way the technology is used to support a business domain, the greater the uncertainty and risk. For example, an established mobile technology may be complex to introduce in a global context for rural health communication, and a new smart bed technology applied in hospital room operations may be complex. In addition, a new technology may also pose challenges to staff if they are not used to it. For example, Prescription@Home may be complex to diffuse to seniors who are technologically less mature or to a pharmacy that is too small to know how best integrate the external digital services. This is when a digital service team may need external partners to complement its teams' skills/experience in either the technology or the application of the technology to a new application domain.

Technical Risk – Customer View: Newer technologies pose greater risks for a breach in confidentiality, especially if these technologies are not well integrated into secure customer systems. For example, robotic technology used to monitor patient room lab services, if not integrated properly into hospital networks, can lead to the compromise of patient data. Similarly, new technologies may also pose risks of failure in availability, as mobile Presectiption@Home may be unavailable to certain seniors with low technology infrastructure. Integrity may also pose a challenge, especially if, for example, the robotic lab scheduling is not properly integrated with hospital systems such as Electronic Medical Records.

Compliance Risk

Digital services gather a significant amount of customer data for storage, manipulation, and dissemination. In addition, a firm may use several digitized processes to support collaboration with suppliers/partners. For example, certain regulatory considerations are important to consider

when patient data must be processed or customer data is moved among internal and external stakeholders. Similarly, collaborative design of digital services can lead to confusion over who owns the intellectual property, and collaborative partnerships in the delivery of the services (e.g. use of PayPal for payment processing or FedEx for shipping prescriptions) may lead to conflicts over who is responsible when access to services is disrupted. Of course, speed in digital services delivery must be weighed against the regulatory processes used for approvals (e.g. wrist monitoring devices must be approved by the Federal Drug Administration, if they are tracking patient's biological data such as temperature, blood pressure, etc.).

Compliance Risk – Digital Service Team Perspective: Lack of internal processes or guidelines as well as insufficient oversight over how specific applications operate in domain can lead to significant risk to a digital service business. In addition, staff training in how customer data is accessed, stored, and distributed becomes very critical. Many security failures occur not from outside threats, but rather from ill-advised processes or improperly-trained employees.

Compliance Risk _Consumer View: This risk is directly linked to how customer data is handled to address confidentiality, how it is processed to support integrity of operations, and how it is accessed by consumers. For example, Presceription@Home may collect and store some of the patient prescription information in separate files so that confidential data can be separated from non-confidential data. It also allows the firm to provide selective access to certain individuals internally as they support payment, prescription filling, and insurance claims processing functions. Also, controlled access to data will be provided to those in prescription delivery (what PayPal may get for collecting payment, and what a delivery truck personnel gets for prescription delivery), and what a physician gets to see for prescription tracking. This ensures confidentiality while preserving the need for access to the data/product.

Strategic Risk

One of the key reasons for developing digital services is to meet customer expectations at a faster speed, and the steps we have taken thus far help with the design and delivery of these services to support both speed and agility as business and individual customer expectations change. Given the high visibility of a potential failure and its impact on a firm's brand and reputation, firms must carefully review service encounters that have the potential for failure or missed expectations.

Strategic Risk - Digital Service Team Perspective: If the goal of the digital service firm is to improve the response time in delivering prescriptions accurately to seniors, then the service encounters associated with gathering prescriptions and verifying them using physicians take greater precedence over others. The firm may need to carefully consider

- technologies are used (e.g. established as opposed to new technologies to reduce errors in transmission),
- processes are set up to support the integrity of operations (e.g. dual input of prescriptions from customers and physicians to ensure accuracy), and
- training staff has meeting requirements related to patient prescription data capture and use.

Strategic Risk – Consumer View: This goes beyond what is done within the firm and how it is supporting unique consumer needs. How does a Prescrition@Home gain the confidence of seniors that their prescription information will not be compromised, that it is used accurately to get their prescriptions filled, and that these prescriptions will be delivered when needed? In other words, are the value propositions of the service met the customer's expectations and gained their confidence to retain them as well as engage them in improving the services in the future?

In summary, we have looked thus far at how different types of risks should be looked at from both internal or digital service team's perspective as it collects and processes customer information, and a customer's view since services should be available to the customer when needed. Next, we will look at some risk mitigation strategies.

11.3 Risk Mitigation Strategies

Customer View

Given that digital services are information systems that in general provide valuable input to support customer decision making or operations, risk mitigation strategies are often related to controlling the processes used for input, processing, and output of relevant data. The data inputs must be easy to use, reduce errors in data entry, and protect data from unauthorized use. The data presented to the user must be accurate and predicable, not inconsistent when the same scenarios are presented to the system at different times. The data used must follow all confidentiality requirements established in processing the data, and access to the data must be limited to those who should have access to it. Methods for preventing, detecting, and correcting information system related risks are well documented in the IS literature, and some of these are discussed in Appendix 11.1

Digital Service Team's View

In general, organizations developing new digital services to support innovative customer value propositions can use alternative business ventures or models that will minimize disruption to their current business models and operations. Some examples are listed below:

- The joint venture by Sony and Erickson to address a shortage of processor chips to meet customer demand;
- The strategic alliance between IBM and Apple to provide customer experience to IBM products; and
- The legal partnership Warner Brothers established to form an entity to explore new businesses models such as musical movies.

Other methods, as discussed here, include incorporating modularity to prevent business failure and incorporating iterative approaches to designing and delivering services incrementally to reduce exposure to risk due to changing customer expectations. Methods such as effectuation and lean start-up also emphasize the iterative approach to digital service development. While any of these methods are intended to help mitigate risks, firms can still use other methods to prevent risks at a more granular level. These are discussed specifically for the two cases discussed in this book: Prescription@Home and Patient Room Robot.

Case 1: Patient Room Robot

- Operational risk mitigation
  - Use talent from inside the hospital systems staff to support service integration and select those services with the least degree of complexity first. Use technology vendors of EMR systems when appropriate.
  - Develop strategic partnerships with suppliers of some key technologies such as AI and machine learning, language translation, etc.
- Technical risk mitigation
  - Select standard interfaces to support systems integration at the customer site (hospital), and use, when feasible, loose linkage with the internal databases of these systems. In other words, have these systems provide data in a separate file for easy access and integration with the system.
  - When feasible, use established technologies or vendors (e.g. task scheduling, call directing using alerts, etc.) even if, in the short run, the performance may be slower.
  - Stage the implementation using simple user interfaces and lower customer expectations on some of the performance metrics.
- Compliance risk mitigation
  - Separate data gathered into sub-categories to control for risks associated with confidentiality.
  - Create multiple views, when appropriate, to limit data access to various systems and users.
- Strategic risk mitigation
  - Test the services that are easier to implement first.
  - Form a partnership with the user to reduce failure visibility by selecting a few sites to control any potential negative impact.
  - Make users aware of the nature of the implementation (e.g. beta) so as to manage expectations.

Case 2: Prescription@Home

Operational Risk Mitigation

- Create a certain degree of redundancy in talent when appropriate
  - Require that multiple team members have the needed knowledge to access data and analyze senior information.
- Simplify the task structure to reduce the need for a high degree of expertise
  - Reduce the complexity of physician verification by using a phone call vis-à-vis a mobile alert.
- Use proven stakeholders even if they are more expensive for some time before the team has other effective and cheaper alternatives
  - Use FedEx or Express Mail for prescription delivery in the early stages before developing alternative distributors.

- Use proven technology substitutes as opposed to complex ones, even at the expense of a lower level of service
    - Use web-based or email-based communication of prescriptions before a mobile app is developed for senior use.

Technical Risk Mitigation

- Develop alternative interfaces to support service delivery
- Seniors may prefer a nice interface, but are there other alternatives that can support prescription delivery easily (e.g. scanning a document or having the physician send it directly to start with). Split information based on its value and security needs
    - Separate prescription information using patient numbers and let each of these be sent separately and reduce or minimize privacy concerns,
- Establish different interfaces to support system integration
    - Use alternative means to get prescription data than directly from the complex hospital EMR system (as separate logical file),

Compliance Risk

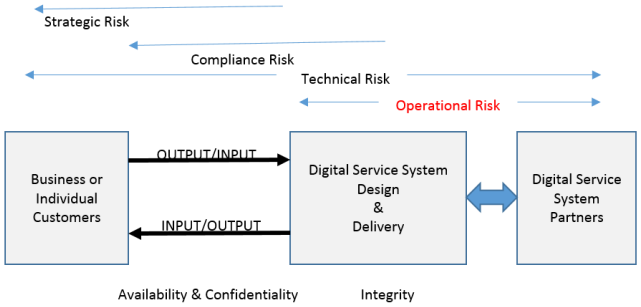
- Split the prescription data into profile, payment, prescription, refill
- Limit data access to select people in the processing value chain

Strategic Risk Mitigation

- Select lead adoptions – seniors who are technologically savvy and willing to test the system
- Select a few pharmacies to test the system
- Start with prescription refills to control the data entry
- Limit the services offered to reduce failure exposure – focus more on prescription handling and less on patient payment

The next chapter will lead us to the last step of the digital leadership framework: implementation. Before we do, let us revisit the DEC distributor and look at how the four risks are addressed.

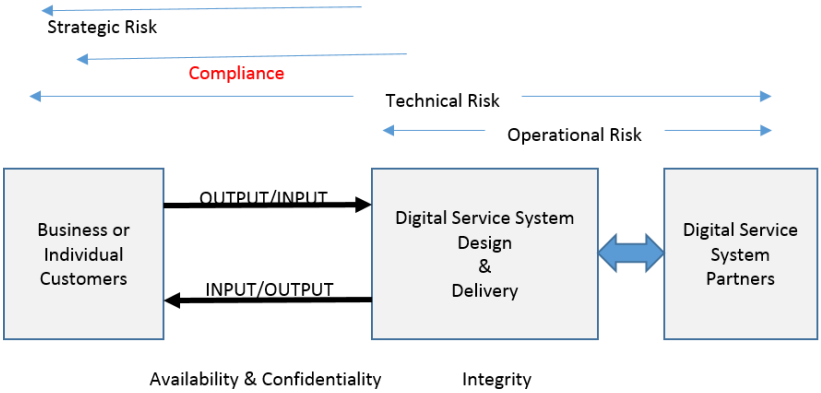
DEC Operational



Operational Risk Mitigation

- Create redundancy in talent when appropriate
  - Require team members to engage in multiple systems (order processing, order fulfilling and inventory mgmt.)
- Simplify the task structure to reduce the need for a high degree of expertise, when appropriate
  - Reduce complexity of inventory management by separating filling regular orders and processing back orders). Separate credit updates from payment management.
- Use proven partners, even if expensive for some time, before internal staff is effective or cheaper alternatives are identified
  - Use established vendors to connect back order requests and select established and large distributors initially to test the system (so they can help test the system)
- Use proven technology substitutes as opposed to complex ones
  - Use web-based order processing with large customers first, before moving to mobile based interfaces

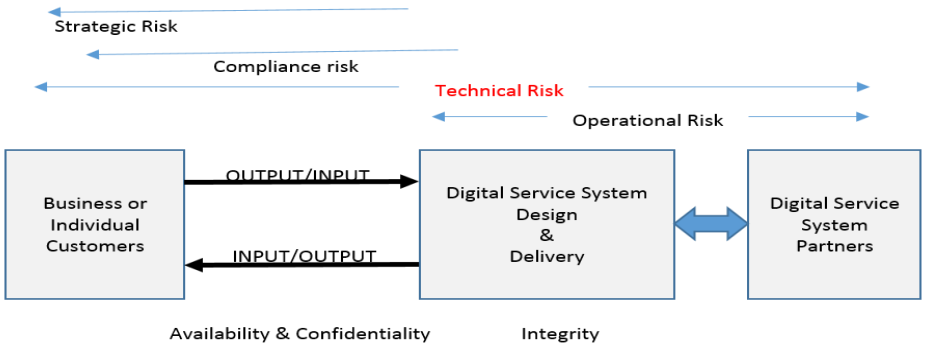
DEC Compliance



Compliance Risk Mitigation

- Split customer data when appropriate
  - Contact, credit, and payment data
- Split order data around processes
  - Order info (to those who fill)
  - Metrics data (for managers),
  - Status data (for customers)
- Limit access to data to select individuals in the value chain
  - Order, inventory, dispatch and accounting staff
- Encrypt data when needed
  - Credit and payment data

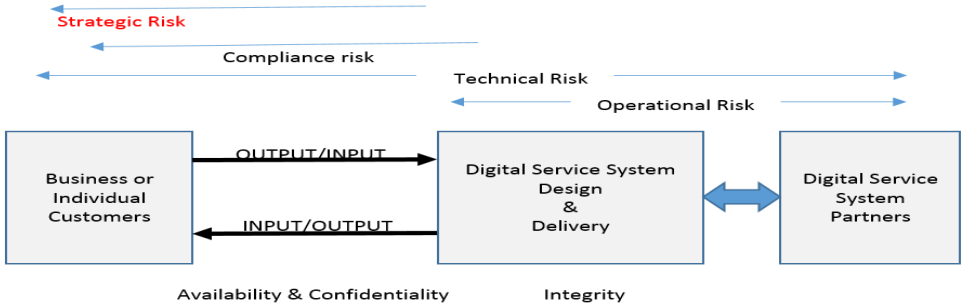
DEC Technical



Technical risk mitigation

- Develop alternative interfaces to support service encounters
  - Large customers may prefer to use traditional interfaces for large orders and may be web/mobile for small orders
  - Payment may be simpler for some before they can use mobile interface for order filling
- Split information based on its value and security needs
  - Separate credit and payment processing from order data
  - Send orders first and separate that from all credit related interfaces
- Used established interfaces between internal processes and customer/stakeholder interfaces for ease in integration
  - Use alternative means to get order entry – connected to their internal system or order small items using mobile or web

DEC Strategic



Strategic Risk Mitigation

- Select lead adopters
  - Select tech savvy large customers first to test the system
- Select established suppliers to test
  - For processing back orders
- Start with established business before new business
  - Process orders of established customers with no back orders
- Provide alternative channels for communication
  - Use web forms, conventional means of faxing orders, and then move to mobile forms
- Limit risk exposure by prioritizing services
  - Order processing before payment processing

12. Implementation and Sustaining Innovation

Implementation is traditionally viewed as the last step of system or service delivery, when all that is promised to a consumer is put in the hands of a consumer. It is often used as a measure of overall success if the implementation is successful on metrics such as customer acceptance, and if the system is delivered on time and within budget. However, as customer requirements (either those of an internal user or an external customer) continue to evolve, the implementation of a system is often expected to lead to the start of the next version of the system, which includes additional features. In fact, users expect the release of such versions, each with improved features, a friendlier interface, better integration with other systems, etc. Organizations view implementation efforts in a similar manner, recognizing their need to include features that surfaced from customer feedback during the system design, but that could not be accommodated in the current version due to time and cost pressures.

The goal of product positioning is to ensure that the version released will be delivering value to customers and the goal of implementation is to make sure that customers see this value. The implementation strategies thus must go back to the firm's understanding of customer strategies to generate value (reducing costs or gaining differentiation through image/visibility/branding, etc.), and illustrate how adopting the new product/service will help realize this value and support their strategies. No matter how well planned the implementation strategy is, not all customers will adopt the new digital services easily. Many implementations call for changes in customer operations, and change is never easy. Hence, implementation research has focused on how to support the adoption of new innovations. One research study [Agarwal et al, 1997] has focused on understanding the influence of factors such as the innovativeness of adopters, the nature of the innovation (product vis-à-vis process), and implementation complexity on implementation success.

- Innovativeness of the Adopter: Even if the innovative digital services are designed to address the needs of customers seeking to realize value, there are always going to be some customers who are going to be early adopters that like to try new things and other customers tend to fall behind in their adoption process.
- Product vis-à-vis Process Innovation: Certain digital services will have a limited impact on the customer's work processes, such as replacing an old tool with a new tool without changing what a customer does (e.g. paying using a web-form vis-à-vis a mobile app, or paying someone using a bank transfer vis-à-vis paying a friend using an app). Others may change the way the work is done from a social or behavioral context (e.g. when digital services receive and send prescriptions to the home or food is delivered to the home as opposed to having customer go to the pharmacy or grocery store, as these may be convenient but alter the way the time is spent in socializing and shopping).
- Implementation Complexity: Certain digital services are inherently more complex to implement because
    - They need to be adopted by many: To realize the full value of the innovation, many customers must adopt it. An example is a volunteer time bank, where you need volunteers to do many different tasks others need, and each is willing to use the time bank to do the work and trade this time with work others will do for them.

- Value is difficult to measure and communicate: Demonstrating the benefit is difficult for those interested in exploring the service. This may involve a digital service that is viewed as a differentiator, but the value of which is hard to measure in the short run. An example is an Apple Watch that is purchased for the novelty value as opposed to its usefulness.
- Digital services that are indivisible: The service cannot be divided into modules that can be offered incrementally. An example here is a digital service that delivers food ingredients and recipes for people to cook at home. The service modules to get food choices, collect recipe and food items for the recipe, and deliver these to the home are all needed to realize the value.

Much of the implementation research is firm-centric, i.e. it examines how firms can use an implementation strategy to make customers adopt the new digital service or innovation. Given that we are using a customer-centric approach thus far, let us look at the implementation strategy from the customer's viewpoint. Before we do that, let us reflect on some of the steps we have taken throughout the design process of digital services to address implementation complexity. We divided the customer service along various service encounters and developed metrics to support each of these encounters. If the customer service can be implemented incrementally, this can help us demonstrate the value of each digital service supporting each service encounter. For example, the Prescription@Home service is divided into service components from a customer's viewpoint: provide customer profile, provide prescription, collect prescription, pay for prescription. This allows the firm to manage implementation incrementally. For example, refill customers who do not need to provide a profile can be an initial group adopting the digital service. Alternatively, some customers may only provide prescriptions using a mobile interface, but they still go to the pharmacy to pick up the prescriptions to minimize change.

Each service encounter implementation can be viewed for its benefit and cost of process/work-flow change independently, and this allows us to best decide how to sequence their implementations for different customer segments. Also, the previous chapter on risk management identified risks associated with service encounters, and this can help us identify the implementation strategy that is appropriate for lead adopters (e.g. those who have a higher level of technological maturity, willingness to take some risks, or greater value to gain), and this may give the digital service firm potential advocates for change when the services should be diffused to others. For example, lead adopters can be those that have many refills to be processed or those who live far from the pharmacy and do not have easy transportation, as they can see the value of Prescription@Home more easily.

12.1 Business Customers

From a business customer's viewpoint, the implementation of any new system means its potential integration with the rest of its operations, some of them possibly supported by other technologies. For example, a hospital introducing the patient room robot must see this service connected with other technologies such as Electronic Medical Record (EMR) systems, nurse call systems, and lab scheduling software. Such an integration of software systems means that implementation requires the coordination of many individuals, some internal and some external, and the adoption of the services by many individuals with varying motivations and reporting

responsibilities is a complex task. For a smoother implementation at the customer site (e.g. hospital), segmenting the implementation effort based on the value of a digital service may not be adequate (e.g. reducing length of stay by implementing a lab scheduling digital service), since the implementation of this digital service requires complex system integration (e.g. integration with systems such as EMR, nursing calling, and lab scheduling). The operational and technical risk assessment of this service encounter (as discussed in the risk mitigation chapter) may have to be weighed in conjunction with the value this encounter provides in sequencing its implementation.

Business customers must also address the role of system-related inter-dependencies, even if they are tightly integrated from a data sharing perspective (as in the example discussed above), since such dependencies can impact a business customer's customers. For example, with Prescription@Home, getting a prescription from a patient is not tightly integrated with prescription filling and payment processing activities, even if they do share some prescription data. However, they are operationally dependent in the sense that they are executed in a certain sequence, and errors at one stage can propagate to others. For example, errors in recording prescription information through the digital service "provide prescription" have a significant impact on the rest of the pharmacy operations. On the other hand, digital service "payment processing" comes at the end of the prescription-processing cycle and will have less impact on pharmacy operations from the clinical or customer delivery perspective. The is also true when a manufacturing firm uses a digital service to analyze its "customer complaint data," as this data is not visible to the firm's customers. The goal is to ensure that implementation does not lead to risks such as denial of access or errors in customer interface, which become highly visible to the business customer's customers. This is addressed as a part of the business customer's strategic risk (i.e. how strategic is the digital service to the customer), and implementation of a service encounter that has a high strategic risk is something that needs careful evaluation.

Business customers view digital service providers as suppliers, and they want all suppliers to adhere to their security/compliance needs. For example, a hospital views its patient data as critically important to meet its HIPAA regulations that protect patient privacy. Any digital service provider that has access to patient data should adhere to these HIPAA regulations. Therefore, data shared between the business customer and the digital service provider should be properly controlled during the implementation process from the confidentiality viewpoint. Again, this risk is evaluated as a part of the compliance risk assessment in the previous chapter, and it may be used to decide how well the risks are mitigated during implementation. If these services are to be introduced early, then certain risk mitigation strategies may be used (e.g. surrogate data when feasible) to reduce implementation difficulties.

In summary, the risks associated with each digital service encounter established in the previous section are used to collectively assess the net risk to sequence the implementation of each of the digital services, or else they are looked at independently but in conjunction with implementation. The innovativeness of the adopter within an organizational context is often related to the risk-taking behavior of an organization. If a business customer is willing to take risks to realize significant gains as opposed to being risk averse, then this may influence the implementation strategy. In fact, those with a high risk taking behavior (sometimes referred to as innovators or technology leaders) nurture an inherent culture within the organization to support

implementing digital services that are risky but provide a higher return to give them first to market advantages.

Methodologically speaking, the template shown in Figure 12.1 below (shown for the digital service patient room robot) can be filled for each of its patient room service encounters against the four different risks. These can then be evaluated against the factors associated with implementation complexity before deciding on the order of implementation. The goal ultimately is to manage change at the business customer site so that the implementation is successful.

Figure 12.1 Template to Assess Implementation Complexity against Multiple Risks

	Operational Risk	Technical Risk	Strategic Risk	Compliance Risk	Net Risk	Business Value
	1 to 5 scale					
Patient Services						
Food Services						
Pain Medication						
Lab Visits						
Business Customer	Risk Taker	Risk Averse				

Referring to the concept of the risk-taking behavior of the organizational leadership, one can sequence the implementation order differently. For example, the Prescription@Home service encounters can be assigned a ranking on various risk categories and ordered differently for pharmacies that are risk averse than for those that are risk takers (see Figure 12.2). While collecting profiles and prescriptions to fill an order will yield the most value to the pharmacy, it also has strategic and technical risk as it introduces this new service to potentially low-tech seniors at home. Therefore, risk averse pharmacies may start at S3 using established payment vendors and work up to implementing mobile digital services (left arrow). On the other hand, risk taking pharmacies may choose to implement the service from the top to gain market leader status.

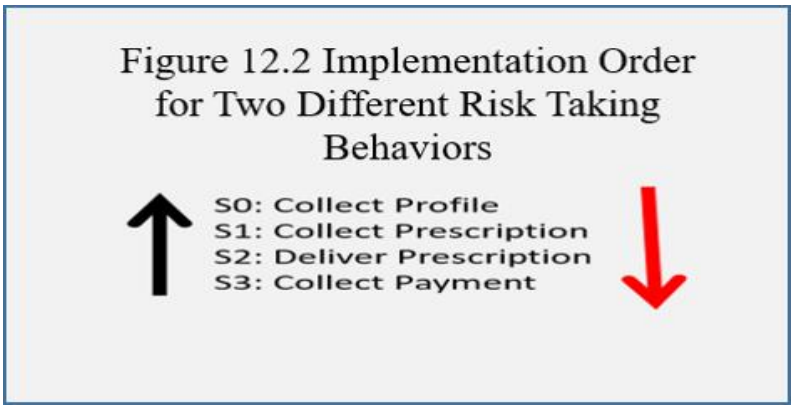


Figure 12.2 Implementation Order for Two Different Risk Taking Behaviors

12.2 Individual Customer

When applying the implementation complexity measures to individual customers, the innovative behavior of the individual customer becomes very important and takes precedence over others. Some customers may be inherently innovative, either because they view their purchasing activity as one that differentiates them among their peers or else because they are technologically mature and willing to try new things to stay ahead on the technology curve. Either way, they potentially become the lead adopters and possibly the influencers in a social media setting to inform, educate, and share their experiences with others. Of course, they can also be the most ardent critics if the implementation fails or the digital service provider is viewed as insensitive to their concerns. Therefore, the goal of the digital service provider is to look for these early adopters to support the implementation efforts. Some of them may be involved in the alpha or beta testing of the digital service and may even have participated in the value proposition or design of the digital service.

While on the surface the logical order of implementation here is to move from high risk to low risk, given that these lead adopters are inherently innovative, the order also must be weighed against other factors such as the nature of the innovation and implementation complexity. Let us first take the nature of the innovation. If it is a product innovation, lead adopters may want to move aggressively to showcase their technological maturity (e.g. seniors with deft skills in mobile use may want to take advantage of the Prescription@Home service to gain the benefits of convenience). On the other hand, if the service alters their behavior, they may be less willing to quickly adopt it and may demand other services to complement it. For example, seniors who go to a pharmacy to socialize after with others over coffee, play games at a nearby center, or purchase gifts for family members may prefer to wait until the app can offer these companion services. These reluctant early adopters may be good candidates to help with sustaining innovation (repeating the innovation cycle) using other complementary or enriching service innovations, and this will be discussed at the end of this chapter.

Regarding implementation complexity, if the value of the service can only be realized when many participate, then the digital service provider needs several lead adopters to move the process forward. Earlier we discussed a volunteer time bank service. There is a similar service that was considered by us to help individuals record their time on a job that they have done voluntarily, such as transport a senior to a pharmacy, do some work at a high school, raise funds for a charity, etc. We considered a company that wants to track the volunteer activities of its employees so that

it can use this to promote their social responsibility mission. However, this can only happen if those who are volunteering are its employees, and if they are working on some purpose to gain a cumulative impact. Such an approach calls for the firm to promote the digital service to its employees and showcase some projects whose mission coincides with the firm's social responsibility goals. The goal here is to steer the volunteer work of employees toward specific work. The digital service provider, in partnership with the firm, has to generate a sufficient number of lead adopters of this service to not only gain adoption but also create a net value for their employer. The strategy here is one of support, where the digital service provider knows what will motivate the adopters and create an eco-system and support structure to support their adoption of the service – in this case, using the employer's interest in an individual's volunteer work.

If the value of the digital service is difficult to measure, then the implementation strategy is to let the individual adopters use trial and error to assess the benefits on their own, and then to share these with their peers. Over time, this may cumulatively reach a level where mere participation in this peer adopter group is viewed as a value-based differentiator. Making the lead adopters senior mentors and giving them "certificates of credit" at different levels (bronze, silver, gold) based on their contribution to the discussion forums or help sessions may be one way to speed up diffusion of the digital service. For example, a health care infomediary has designated a few early adopters of the technology based on criteria such as their ability to answer questions, lead discussion, provide an expert view, or share personal experiences, etc., all related to their experiences in cosmetic surgery. This is often viewed as "individual adoption and individual diffusion," where each lead adopter incrementally brings others on board, and the digital service provider is providing informal support.

If the digital service is not decomposable and has to be implemented fully, then the challenge is to provide the adopters with ample training, give them an opportunity to ask questions, and guide them through the entire process. For example, if a manufacturing firm wants to have its customers do a self-diagnosis of certain product defects, then it should make its adopters learn how to use all the digital service encounters, such as mapping the problem to the design diagram, reviewing what was done in the past from a stored knowledge base of problems/solutions, testing different scenarios, etc. If a digital service is engaged in support of this self-diagnosis, it may want to recruit some of these early adopters and provide them training, proactively guide their self-diagnosis process, and create discussion forums for them to post challenges and ideas to improve the system, etc. The digital service provider may have to designate more resources to support this advocacy strategy.

In all these cases, the goal of the digital service firm is to use early adopters to help with the adoption and diffusion of the service to many other adopters, and over time to as many customers as possible. Of course, a digital service firm may not mandate the use of the digital service to individual customers that are reluctant to change. It can provide incentives for them to try it on their own to see the relative advantages when they adopt the service, assess its compatibility or ease of use, provide them economic advantages when appropriate, etc. Over time, if the digital service becomes a part of an organization they work for or becomes necessary for them to do other tasks, then the adoption process can be speeded up. For example, a digital service that helps a child learn math skills or interact with language modules to learn a new language may be difficult to diffuse until it becomes essential as a part of a teaching curriculum or is needed for

passing an AP exam in high school. Therefore, complementing the digital service with the other needs of a customer may become very critical to speed up an unwilling or non-lead adopter to use a digital service. This leads to the next section – sustaining innovation.

12.3 Sustaining Innovation

The primary goal of a digital service unit within an organization or a firm is to continue to innovate and stay competitive. This means supporting the evolving needs of a customer with new value propositions that can be supported with other innovations. While implementation is often viewed as a success if its meets the original goals, its success should also be measured by its ability to generate new innovative ideas. This is essential in today's changing marketplace, as the people who service a customer during implementation often know the gaps between what a customer is expecting and what a service is delivering. These gaps, if not quickly recognized and addressed in the subsequent versions of the digital service, can lead to customer dissatisfaction. Also, as a digital service is integrated into the customer decision-making process, one can see other factors that are influencing this process that may not have been considered early in the customer interaction and service design. For example, as we designed a digital service to support seniors to remember when to take prescriptions using a mobile-TV interface, we realized that seniors wanted to connect with their family, play games, watch movies on certain channels, etc., and they were not able to meet these needs via their mobile device. These become "complementary" services that should become a part of the digital service App if it is to continue to provide value to the seniors.

The second type of implementation gap is when the digital service offered is just the tip of the iceberg, and you find more about the context within which the customer is seeking the service. For example, a firm developing a digital service that helps with wellness tracking by measuring the steps someone takes during walking or the distance they travel when biking may realize that the individual adopter does many things to track his/her health. The customer swims, plays tennis, hikes, etc., and all these activities contribute to the wellness behavior of the individual. Therefore, the challenge here is to look at how to calibrate some of these other activities so that the wellness tracking takes into consideration the overall healthy behavior of the individual. This will ensure that the service sustains its differentiation. One can extend this decision-making behavior to digital service providers that track food consumption to monitor calorie information, so that an exercise regimen can be prescribed based on target goals on calorie content, etc. This type of service extension relates to "enriching" or "deepening" services to enhance value.

The challenge in digital service extensions is often that some of these extensions are capabilities outside the scope of the digital service firm (e.g. one that specializes in health care). In these cases, a digital service firm may have to develop partnerships with others that can design these complementary services as a joint effort, or are sourced and integrated with those that already provide these services.

In summary, the goal of implementation is to deepen the firm's relationship with the customer for the next set of innovations and continue to seek partnerships/suppliers or build its own internal capacity to stay competitive.

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