Applying Lean Enterprise Principles to Optimize Delivery of Customer Service

By

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B.S. in Systems Engineering, University of Virginia, 2001

Submitted to the MIT Sloan School of Management and the Engineering Systems Division in Partial Fulfillment of the Requirements for the Degrees of

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ABSTRACT

Many companies have realized significant value through the application of lean principles to manufacturing and supply chain operations. Dell Inc. in particular garnered international fame for its ability to manufacture and deliver computers using a lean, direct-to-customer approach that provided a tremendous competitive advantage. The Author suggests that these same lean principles can be applied to improve a firm's service and support operations, while acknowledging some important nuances of applying lean in a customer service environment.

The Author calls to light a key differentiator between lean manufacturing and lean customer service. Specifically, while customers use relatively consistent value systems to assess manufacturing operations, different customer segments typically value customer service in very different ways. Thus, lean customer service must begin by thoroughly characterizing the value expectations and contributions of each customer segment. After characterizing these value systems, a firm must design a support channel architecture aligned with the value exchange system of the entire customer population. After designing a lean channel architecture, lean principles may be tactically applied to optimize performance within individual channels.

This research project focused on improving customer service operations at Dell by using lean principles to: 1. Establish a data-driven, strategic architecture for Dell's consumer support division and 2. Identify operational improvement opportunities to drive the tactical execution of that strategy. The project began with a benchmarking study of customer service strategies at companies such as Best Buy, Apple, Fed-Ex, Amazon.com, GM, and Comcast. The Author then proposes a "Lean Support Channel Architecture" using on-line and retail service channels to offload demand from the call centers, effectively eliminating waste from call centers. Finally, the Author examines how lean principles can be tactically applied to a retail service channel to enable the cost-effective delivery of retail support in line with the support channel architecture proposed.

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1. INTRODUCTION

1.1. Project Background

The motivation for this research project stems from the broad strokes of criticism recently directed towards Dell customer service offerings, most notably in 2006. This dissatisfaction among Dell customers was a consequence of several cost-reduction actions taken by the firm in 2006, which included[1]:

- Stricter adherence to warranty boundaries
- Reducing warranty periods
- Off-shoring and outsourcing call center operations

These actions, among others, caused customer service ratings, as measured by customer feedback surveys, to decline significantly from 2006 to 2007, thereby eroding Dell's image and reputation among consumers. The troubling result was illustrated on multiple fronts, including:

- Falling in the American Customer Satisfaction Index rankings[2] (Figure 1 below)
- Criticism of Dell's customer service on public blogs
- A decrease in performance across Dell's internal customer experience metrics

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[1] "Interview: Dick Hunter, VP Customer Experience at Dell". Service Untitled. 15 May 2007. <serviceuntitled.com>

[2] "2007 Scores by Industry: Personal Computers". American Customer Satisfaction Index. 15 Feb. 2008. <http://www.theacsi.org/index.php?option=com_content&task=view&id=149&Itemid=157&c=Dell+Inc.&i=Personal+Computers>

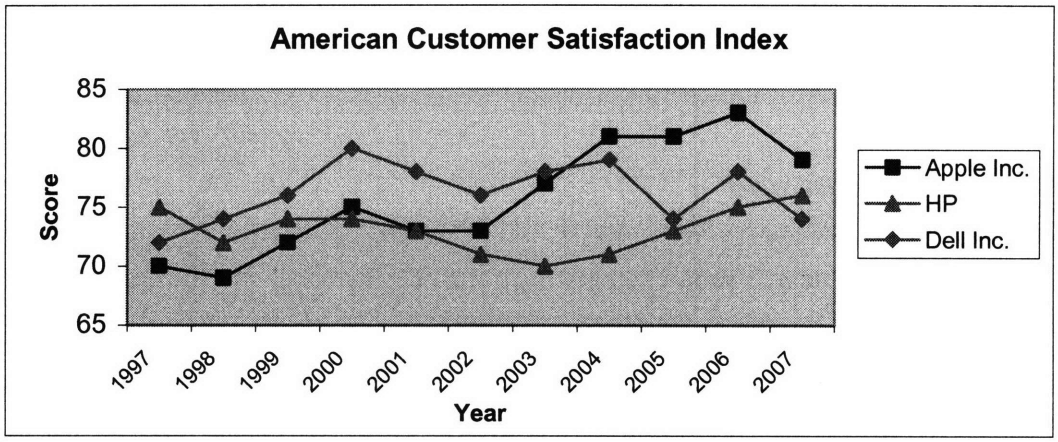

Figure 1: American Customer Satisfaction Index Scores for Personal Computers

At the same time customer service ratings were declining, competitors were getting closer and closer to matching Dell's industry-leading low prices. This unsettling business climate quickly got the attention of senior leadership at Dell who immediately called for a company-wide effort to "turn the customer experience around", placing a particularly strong emphasis on service and support operations. Initial improvement efforts were primarily focused on the call centers, as the majority of customer complaints stemmed from frustrating experiences with call center support. Early initiatives involved hiring additional agents with more advanced training and better communication skills. This proved to be a good short term solution with some initial benefits. Although customer service ratings leveled off after about nine months, Dell was confident it could do even better.

1.2. Statement of Problem

When it became clear that these incremental improvements were not sufficient to meet customer expectations, Dell began searching for other innovative options to boost service and support performance. It is no secret that Dell's manufacturing success was built upon a foundation of lean operations. Thus, in an effort to extend best practices across the entire value chain, the question Dell posed for this research project was: **How can lean principles be applied to improve the delivery of customer service?**

1.3. Thesis Overview

This thesis provides a response to the problem stated above based on a six-month research project conducted at Dell's global headquarters in Round Rock, TX. Following is an overview of the paper's organization outlining the main topics addressed in each chapter.

Chapter 1: This chapter provides the historical context for the project, setting the stage for the discussions that follow. The project's rationale and objectives are presented, including a formal statement of the problem to be solved.

Chapter 2: This chapter provides a detailed overview of Dell, Inc. and the Dell Consumer Services division that sponsored this project. It concludes with a discussion of the recent challenges facing Dell Consumer Services that ultimately led to this research project.

Chapter 3: This chapter is dedicated to the benchmarking initiative conducted as part of the project research. A detailed review of the benchmarking methodology is presented, including which companies were studied, why they were selected, and how data was collected. The chapter concludes with a summary of the benchmarking data and key lessons learned.

Chapter 4: This chapter first outlines the main customers and responsibilities of Dell Consumer Services. We present a discussion of the various research approaches used to investigate the preferences and values of key customer segments. Finally, the Author synthesizes the customer preferences research findings into an original matrix framework and explains an important implication of the results relative to Dell Consumer Services.

Chapter 5: This chapter presents a basic introduction to the theory and principles of lean. Fundamental tenets of lean are presented, followed by a discussion of the major benefits lean companies enjoy. The Author briefly explores how common advantages enjoyed by lean manufacturers could translate into a services environment.

Chapter 6: This chapter explores the strategic application of lean to the Dell Consumer Services environment. Customer value exchange systems are explored, followed by an assessment of the relative priority of customer value expectations. The Author presents strategic recommendations for Dell Consumer Services' support channel architecture based on lean value delivery.

Chapter 7: This chapter explores the tactical application of lean enterprise principles to the retail service channel using Dell's pilot retail store and service center as a case study. As part of the

case study, the Author documents a value stream map, identifies improvement opportunities, and proposes lean process changes. Performance improvement highlights are discussed.

Chapter 8: This chapter summarizes the key lessons learned from this project, and proposes a set of recommendations for addressing the most significant opportunities for improvement.

2. DELL AND THE CONSUMER SERVICES DIVISION

2.1. Dell Inc.

Founded in 1984, Dell, Inc. has grown into a Fortune 500 company and one of the most recognized brands in the world[3]. Dell sells a comprehensive array of products and services including laptops, servers, IT services, and third party flat screen televisions. Perhaps Dell's most distinctive feature is its "Direct Business Model", wherein it sells fully customized products directly to customers. This strategy revolutionized the PC business by enabling customers to order customized computer systems directly from the manufacturer at a price point well below competitor offerings. In 2007, Dell generated annual revenues of $60 billion and sold more than 39 million computer systems[4]. Dell's primary competitors include Hewlett Packard, Apple, Lenovo (formerly IBM), and Sony.

2.2. Dell Consumer Services

Dell segments customers into two primary business groups: Consumer and Business. The Consumer division caters to customers purchasing products and services primarily for home and personal use, while the Business division includes all business, government, and education accounts. Within the Consumer division sits the Dell Consumer Services functional group. This group is responsible for the delivery of all service and support to consumer customers, including order management, technical support, and general customer care. Historically, Dell Consumer Services supported customers primarily through call centers located both domestically and internationally. Support was also available through the internet via Dell's support website (support.dell.com), but until very recently, the site has been positioned as more of a knowledge base than an interactive tool to guide customers in resolving issues.

Dell Consumer Services uses customer feedback surveys to monitor its performance, collecting a variety of information from customers following their support experiences. Though the surveys

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[3] "The Harris Poll, #71". HarrisInteractive. 17 July 2007. <www.harrisinteractive.com>

[4] Dell, Michael. "Fiscal 2007 in Review". About Dell: Financials.
<http://www.dell.com/content/topics/global.aspx/about_dell/investors/financials/index?c=us&l=en&s=corp>

include numerous questions that measure multiple aspects of the customer's experience, Dell Consumer Services has increasingly focused on two principle axes: customer satisfaction and issue resolution. The customer satisfaction, or "CSAT" metric measures how satisfied customers were with their call center experience, while the "issue resolution" metric measures whether or not the agent resolved the customer's issue adequately. Both metrics capture critical insight about the performance of the agents and the call center operations in general. Taken together, they provide a good indication of Dell Consumer Services' performance at a high level.

2.3. Recent Challenges

Ironically, one can derive a great deal of insight into the challenges facing Dell Consumer Services simply by examining the name of the group itself. As a "services" organization, the group is tasked with solving a broad range of open-ended issues, many involving technical troubleshooting. Moreover, the group is tasked with serving "consumers", which means many of its customers have very limited knowledge of or experience with computers. Finally, the brand "Dell" immediately signals the absence of any face-to-face interaction with customers, which adds a final degree of complexity to an already difficult mission of servicing consumer customers. Effectively, Customers expect Dell to provide an experience similar to a retail channel via its phone support channel.

In 2006, initial efforts to strengthen Consumer Services performance in Dell's call centers aimed to improve both the CSAT and Issue Resolution Rate metrics outlined in the previous section. After hiring additional call center agents with stronger technical and communication skills, Dell saw a marked improvement in performance scores measured through customer feedback surveys. In May 2007, former VP of Customer Experience Dick Hunter described the situation as follows: "Over the last six months, our numbers have been going up. They went down very significantly until September of last year. At that point, we started turning things around. We're reaching levels that are similar to where we were 3 years ago"[5].

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[5] "Interview: Dick Hunter, VP Customer Experience at Dell". Service Untitled. 15 May 2007. <serviceuntitled.com>

As competitors continued to erode Dell's historic price advantage, customer service became a factor of increasing importance in purchasing decisions. Thus, Dell's executive leadership team was anxious to improve the company's public image with respect to customer service. The Consumer Services Division launched a myriad of projects and initiatives in 2007 to jumpstart performance in call centers and on-line chat sessions. For example, agents were offered additional training in English language skills, customer management tactics, and Microsoft software. Call centers experimented with new routing systems and upgraded agent desktop tools. Dell Consumer Services also worked with the product development division to expand the array of automatic repair tools preinstalled on new Dell systems. Additionally, Dell Consumer Services leadership began to contemplate how lean manufacturing theory might apply in this environment, which provided the genesis of this thesis research project[6]. The author used a benchmarking study, on-site research, and lean theory to triangulate towards a set of recommendations for Dell Consumer Services. The next three chapters present a detailed discussion of each respective tactic.

[6] Lee, Louise. "Dell: Facing Up to Past Mistakes". Businessweek 19 June, 2006. <http://www.businessweek.com/magazine/content/06_25/b3989045.htm>

3. BENCHMARKING INITIATIVE

3.1. Rationale, Selection Criteria, and Population Overview

As a first step, the Author elected to study the service and support operations of other organizations in an effort to ascertain best practices. The goal of this exercise was to understand the strategic design and tactical operations of successful customer service organizations. Delivering customer support is a common business activity that certainly transcends corporate and industry boundaries. Thus, direct competitors as well as tangential businesses were considered when selecting a study population for the benchmarking initiative. The Author was chiefly interested in companies for whom post-transaction service and support plays a significant role in delivering an excellent customer experience. This selection criterion invites a variety of businesses, from those providing products with subsequent service requirements, to companies in the services industry for whom every customer interaction is essentially a service provision. It is important to note that the Author was not only interested in the call center management practices of other companies, but also, if not more so, in the fundamental strategies of leading customer service providers, regardless of their industry or service channel offerings. Access to key representatives within a company served as a secondary selection criterion. In an effort to obtain the most accurate, candid, and comprehensive information possible, the Author gave priority to companies wherein access to internal resources was available.

The final benchmarking population consisted of six companies spanning a broad range of industries and products. Each company was chosen based on the strong reputation of its customer service, as well as the Author's access to internal resources. The following table outlines the study population, including the methods employed to access company data and interact with internal resources where possible.

Company	Industry	Research Methods Employed		
		General Research	Internal Resource Interviews	Direct Participation in Service Process
Fed-Ex		X		X
Amazon.com		X	X	X
Apple / Genius Bar	Consumer Electronics	X		X
Best Buy / Geek Squad	Consumer Electronics	X		X
Comcast	Telecommunications	X	X	
GM / OnStar		X	X	

Table 1: Benchmarking Study Population

3.2. Benchmarking Research Methodologies

As shown in Table 1 above, the Author used a variety of methods to gather information about the service operations of companies in the study population. General research of public sources was conducted to obtain a baseline idea of the customer support services offered by each company. To supplement this baseline research, the Author also conducted active tests of the customer support systems and processes at several companies. Finally, personal interviews were conducted at companies where a direct point of contact was accessible and willing to engage in such discussions.

Specifically, Apple's Genius Bar and Best Buy's Geek Squad were both tested first-hand by submitting a laptop for repair and documenting the customer service experience throughout the service cycle. Similarly, the Author mailed a package via Fed-Ex and purchased a backpack from Amazon.com in order to actively test the package tracking and order management services offered by each company. Perhaps the most valuable source of benchmarking data came from personal interviews conducted with current or former employees of several companies. A former call center manager from Comcast agreed to a personal interview, which provided valuable insight into both the strategic and tactical operations of Comcast customer support to cable,

telephone, and internet subscribers[7]. Additionally, by leveraging MIT's Leaders for Manufacturing network, the Author formed a benchmarking alliance group with representatives from Amazon.com, GM OnStar, and MIT faculty to collaborate on common challenges and share best practices in customer support operations[8]. The group met weekly via teleconference and engaged in candid discussion of topics including channel distribution (online, call center, etc.), performance metrics, employee management, and current challenges.

3.3. Summary of Findings

The benchmarking initiative provided valuable insight into the strategies and practices of leading customer support providers. While the exercise yielded a number of interesting observations, several lessons in particular stood out relative to Dell Consumer Services operations.

First, companies in the study population employ a greater variety of channels to deliver service and support to customers, relative to Dell. In addition to call centers and support web sites, these companies took more advantage of retail stores, cellular phone text messaging, and dispatching service directly to the customer's home as appropriate.

Second, companies in the study population distributed service delivery more evenly across the available support channels. While Dell shouldered the majority of customers' service requests though call centers, Amazon, Fed-Ex, and others shift a greater proportion of service delivery to their alternate channel offerings.

Third, Apple and Best Buy have successfully established retail and in-home customer support functions and positioned them as standalone, branded services. Customers view Best Buy's Geek Squad and Apple's Genius Bar as independent, value-adding services. These companies use distinctive uniforms, creative storefronts, and other marketing tactics to build a unique service experience that differentiates their service offerings from that of the competition.

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[7] Rowello, Rob. Personal Interview. 9 April 2007.

[8] Membership Included: D. Hunter & T. Wala (Dell), T. Weiland & K. Carter (Amazon.com), M. Peterson (GM OnStar), S. Graves & D. Nightingale (MIT)

Finally, assimilating these observations yields the principal best practice discovered through the benchmarking study:

- Leading service providers predetermine the best channel for delivering specific types of support to specific customer segments, and use that information to proactively direct customers to the most effective channel for resolving a particular issue.

For example, at Fed-Ex and Amazon.com, the majority of customer support requests involve feeding customers basic information (e.g. shipping status, estimated delivery dates, address details, etc.) as opposed to solving complex technical problems. As a result, these companies deliver the majority of customer support through their respective websites. After all, the internet is far and away the fastest, cheapest, and most convenient channel for delivering that kind of support. Both companies also use proactive e-mail and text messaging to notify customers of delays, changes, and general status updates. This strategy "pushes" valuable information to customers at a very low cost to prevent customers from "pulling" information at a much higher cost by contacting call centers.

At the other end of the spectrum, customers at Apple and Best Buy need help resolving issues of much greater technical complexity. Thus, Apple and Best Buy (via the Genius Bar and Geek Squad services respectively) give customers the option of walking into a store, placing a laptop down on the counter, and talking to an agent about how to fix the problem. Acknowledging that it is very difficult to deliver technical support over the phone or internet to certain customer segments, these companies have chosen to offer customers a retail support channel as well. In the case of Geek Squad, agents will even visit a customer's home. Even though Apple and Best Buy charge a premium for these service channels, it is clear that many of their customers prefer, appreciate, and are willing to pay for this option.

The key lesson learned through this benchmarking exercise is that no single support channel serves as a silver bullet for providing customer service. Best-in-class companies deliver top tier customer service by determining what their customers value in a service experience, and then designing the appropriate service channel architecture to deliver that value.

4. DELL CUSTOMER PROFILES AND PREFERENCES

The benchmarking study illustrated that no single support channel is universally optimal for delivering customer service to all customers across all issues. Web-based support is certainly ideal for Amazon.com, while call center and retail store channels are essential for Best Buy. Thus, the best channel for delivering customer support is actually a function of two factors:

1. The customer profile
2. The issue at hand

That is to say, for any given customer and issue pair, there will be an ideal service channel to resolve the issue. In order to guide Dell Consumer Services in architecting the optimal support channel structure, the Author first developed a better understanding of Dell Consumer's customer profiles and preferences.

4.1. Dell Consumer Services Customer Profiles

Dell offers a wide variety of product lines appealing to an equally wide variety of customers. So who are Dell Consumer's customers? According to resources within Dell Consumer Marketing, Consumer customers include everyone from brand new users who have never touched a computer keyboard before, to high school and college students with a sound familiarity of computers and software applications, to experienced computer gamers and programmers seeking the absolute best in performance and innovation.

New and inexperienced users have very little knowledge about computers. Thus, their ability to describe a technical problem is extremely limited. Similarly, their ability to follow an agent's directions towards resolving a technical problem is very limited as well. Common vocabulary words such as "double click", "window", or even "monitor" may be unfamiliar to these customers. On the other hand, advanced users such as programmers, avid computer gamers, and IT professionals also fall under the "consumer" umbrella. These customers typically have a thorough technical understanding of their systems. With advanced training and extensive experience, many may even be more technically savvy than customer service agents employed by Dell or its competitors. This diverse customer base poses an interesting challenge to Dell

Consumer Services as it attempts to meet the service and support needs of such radically different customer segments.

4.2. Dell Consumer Services Responsibilities

Dell Consumer Services is responsible for supporting customers following the initial order placement and continuing throughout the remainder of the customer experience. As a result, the Consumer Services organization fields a wide variety of customer requests. Generally speaking, Dell Consumer Services provides three types of customer support: order management, technical support, and value-added services.

Order management requests (also called customer care internally), almost always occur *before* the customer receives the order, and are very similar to the services provided at Amazon.com and Fed-Ex. Resolving these issues is typically a matter of retrieving information from a database or other informational system, and relaying that information back to the customer. Generally, resolving order management service requests does not involve "solving a problem" per-se, but rather "relaying information. Thus, the ability of agents to quickly access Customer information is critical to driving a good Customer experience. Typical examples of order management requests from Dell Consumer customers include:

- "When will I receive my laptop?"
- "Can I change the shipping address for my order?"
- "I want to add a carrying case to my order."

Technical support service requests are generally the most challenging issues to resolve. Agents must work with the customer to understand the issue, diagnose the root cause of the issue, determine a solution, and execute the solution. Depending on the customer's computer literacy and emotional state, this process can be relatively simple or incredibly complex. Unlike most order management issues, technical support issues present a problem that must be solved. This ads a layer of complexity, and often technicality, that makes resolving technical support issues significantly more difficult than answering order management requests. Technical support issues may be caused by a corrupt software application, a faulty hardware component, user error, or any combination of the above. Resolving technical support issues may involve coaching a customer through the appropriate resolution steps, dispatching a new part to the customer, dispatching a

service technician to the customer's home, or even replacing the customer's entire system. Resolving technical support issues is very expensive, as it may take a lengthy telephone conversation with a call center agent, to accurately diagnose and fix the issue. Dispatching spare parts, replacement systems and service technicians further increases the cost of providing technical support. Additionally, most of the systems are still under warranty, so Dell does not collect revenues for the services provided. It is also important to note that technical support issues are sometimes accompanied by emotional customers who may feel frustrated, disappointed, scared, angry, or all of the above, about the technical issues that they are experiencing. The fear of losing data or the inconvenience of being without a computer creates an emotionally charged customer and often further complicates the resolution process. Typical examples of technical support requests from Dell Consumer customers include:

- "Every time I open my internet browser, my system crashes."
- "My laptop is plugged in, but it is still running off the battery."
- "My computer will turn on, but all I see is a blue screen."

A final category of support provided by Dell Consumer Services is commonly referred to as "value-added services". This is a offering for Dell Consumer Services, available primarily in conjunction with the *Dell On Call*[9] premium service package. Customers may elect to purchase the *Dell on Call* service package at the point of sale. Alternatively, the *Dell on Call* service package comes standard with the purchase of any system from Dell's top of the line XPS product line. Value-added service offerings represent Dell's goal to become a customer's trusted advisor for any and all computing related products and activities. For example, *Dell on Call* agents can meet with customers in their home to install new systems, set up home networks, back-up data, provided one-on-one training, and much more. These services are termed "value-added" for two reasons. First, in addition to ensuring customers are satisfied with their current Dell products, *Dell on Call* agents add value by helping customers expand their use of technology and discover new ways to benefit from other Dell products and services. Second, unlike standard warranty services, these offerings are not complimentary. Thus, they add value directly to Dell's bottom line by generating revenue that helps to off-set the high cost of providing warranty services that

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[9] Dell on Call Product Offering Summary.
<http://support.dell.com/support/topics/global.aspx/support/gen/dell_on_call?c=us&l=en&s=gen>

meet the needs and expectations of Dell Consumer customers. *Dell on Call* is designed to increase Dell's share of the value-added services market. Recent studies suggest that the value-added services market in the United States is a multi-billion dollar space, of which Dell currently owns a relatively small share, compared to the hardware market. Dominant players include Geek Squad and Fire Dog, with the balance comprised of local computer repair and advisory companies.

4.3. Dell Consumer Services Customer Preferences

In order to improve the performance of Dell Consumer Services, it is critical to thoroughly understand the preferences of the organization's end users – the customers. This is no easy task with such a wide variety of customers and services. The Author took several approaches to gain a sense of what customers value in a services organization, and compared that to the current operations of Dell Consumer Services. As described in Chapter Three, the benchmarking initiative provided valuable insight into customer behavior at other organizations. This allowed the Author to observe how customers respond to various service offerings and strategies, specifically online self-service interfaces and fee-based retail store support. The Author also observed calls firsthand at Dell's call centers to gain insight into the voice of Dell's customers. Direct customer input and feedback were obtained through Dell's "Idea Storm", a public web forum where customers have the ability to submit ideas for new features, products and services[10]. Finally, a thorough review of published literature as well as internal market surveys obtained from Dell's Marketing department provided quantitative and qualitative information about what customers expect and value in computer-related services. Interestingly, while Dell had been working hard to improve performance in the call centers, this research generated strong data suggesting customers actually prefer alternate support channels in many cases.

As personal computers continue to penetrate the consumer market, it is reasonable to hypothesize that many customers would prefer to get computer-related service and support through a retail channel or directly in their homes, even if there was a fee involved. This premise is empirically reinforced by the overwhelming success of service offerings such as Geek Squad and Firedog, where customers pay hearty premiums for face-to-face support in Best Buy and Circuit City

[10] www.dellideastorm.com

stores, or directly in their homes. During a recent visit to the Geek Squad counter, the Author observed several customers with Dell laptops waiting in line. This implies that some of Dell's customers would prefer to pay for service through a 3rd party retail channel rather than work through Dell's phone or internet support channels.

While there is a proven demand for retail and in-home service among Dell's customers, there is an equally strong demand for effective self-service options through the internet. According to a senior executive in Dell's Consumer Services organization, many call center contacts come from customers who *attempted* to resolve their issue online at Dell's website before calling the call center[11]. This clearly indicates that a meaningful proportion of Dell's customers have a willingness and preference to resolve issues online instead of enlisting the help of an agent. Unfortunately, some customers have difficulty finding relevant information on Dell's support website, as the nature of the content uses technical language and terminology that may be difficult to understand for customers with modest technical experience.

As stated at the beginning of this chapter, the best channel for delivering customer support is a function of both who the customer is, and what the issue is. Using the customer preferences research described above, the Author developed the following matrix illustrating which support channel different customer segments prefer for various issues.

[11] Hunter, Dick. Personal Interview. 10 August 2007.

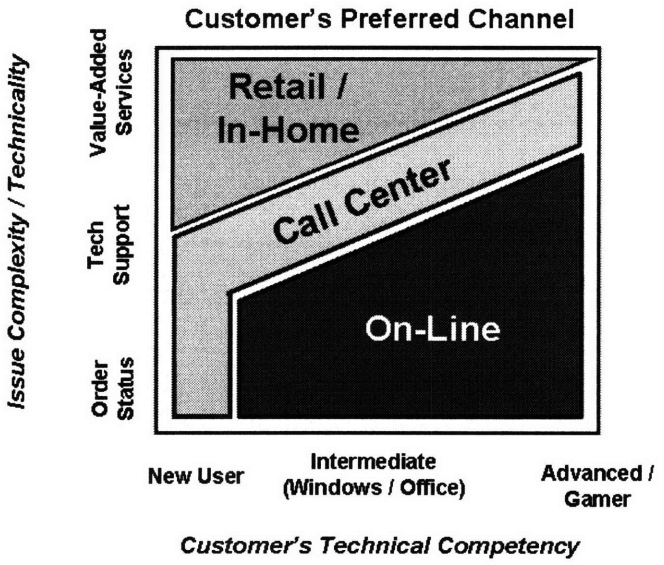

Figure 2: Channel Preferences Matrix

The x-axis represents a customer's level of technical competency. This axis ranges from new users purchasing their first computer, to intermediate users with a working knowledge of the Windows operating system and Microsoft Office software, to advanced programmers and "gamers" with in depth knowledge of computer hardware, software, and networking. The y-axis represents the complexity and technicality of the customer's issue. This axis begins with straightforward order status updates, includes the broad array of technical support issues, and ends with value-added service offerings such as home installations and training. The key message illustrated in this matrix is that the best channel for delivering support to one customer may be very different for another customer, depending on the customer's level of technical competency and the issue at hand.

In the case of new users at the far left, on-line order management support may not be an option at all, as these first time buyers often do not have access to a computer until their new system arrives. Thus, new users typically prefer to work with call center agents for simpler issues, and almost always prefer retail or in-home support as issues become more technically complex. Moving to the center of the customer axis, intermediate users express a greater preference for using online support channels to resolve order management and basic technical support issues. These customers are typically familiar with and comfortable using other online service interfaces, such as Fed-Ex, Amazon.com, or airline websites. Thus, they prefer the speed and convenience of resolving issues online, and choose to do so for issues within their technical

"comfort zone". As issue complexity increases beyond that technical comfort zone, intermediate users express a greater preference for the call center support channel where experienced agents can help resolve the issue. Intermediate users continue to express some interest in retail or in-home support, though to a lesser extent than novice users. For an intermediate user with average technical competency, the real value of a retail support channel is driven more by convenience than a need for extra help beyond a call center agent's reach. At the far right of the customer axis, advanced users and gamers express a virtually universal preference for the online support channel. These users hold extensive knowledge about their systems and the computing industry in general. They may become frustrated by the systematic line of questioning call center agents are required to follow, and much prefer to diagnose their own issue using online content and community forums where they can collaborate with other experts. As one IT Professional customer stated, "When I encounter a problem, I research the issue (Google) and trouble-shoot the problem. I make it a practice to not call Tech Support until I have exhausted all of my trouble shooting resources. It is very frustrating to always have to start at the beginning...and do all of the same tests again according to their script."[12] Advanced users occasionally need the support of a call center agent to order specific replacement parts after trouble-shooting their own system, or to request technical specifications about systems they are working with. While these customers are obviously not prime targets for training or installations, they may procure other lines of value-added services, such as custom modifications to Dell products or advice on integrating Dell products into home theater systems. Thus, they express a minor preference for call center, retail, and in-home services towards the highest end of the issue complexity axis. Building on this model of customer preferences, it is also interesting to note the relative importance of each channel to Dell as a business. The following table outlines the relative cost per contact of each channel, as well as its relative customer appeal based on the annual number of contacts received.

[12] Hewitt, Linda. Customer input submitted to Dell Idea Storm. 5 May 2007.

Service Channel	Appeal (% Total Contacts*)	Cost per Contact
Online Self Support	High	Very Low
Chat and/or e-mail	Low	Medium
Phone	Medium	Medium
Field / Dell on Call	Low	High

*Note: "Total Contacts" includes issues that were resolved automatically (i.e. "on the box") without proactive customer contact. For the purpose of this research project, only customer initiated contacts were considered.

Table 2: Service Channel Comparison: Appeal and Cost

The first key observation from Table 2 is how quickly the cost per contact increases with the level of agent assistance provided. We see a significant increase in cost between online unassisted self-support (i.e. no agent interaction) and live phone support. Obviously Dell as a business would like to drive as many contacts as possible to the unassisted web channels in order to minimize costs. The second key observation is that many of Dell's support contacts originate on the web. We say these contacts "originate" on the web, because some customers are unable to resolve their issue online and thus roll over to assisted channels with higher, and in these cases redundant, costs. Though some warranty repairs require dispatching technicians to a customer's home, the daunting cost/contact cost of supporting customers in the field can be partially offset by the revenues from Dell on Call sales. In fact, given the current market size for value added services, expanding Dell on Call offerings could potentially offer a strong counterbalance to the costs of warranty support across all channels. Another positive note is that according to the Channel Preference Matrix in Figure 2, many customers want to use the web to resolve their issues, provided the user interface creates a customer-friendly experience. Thus, if Dell can effectively structure its online support pages to deliver a more effective customer experience, contacts to the more costly assisted channels should decrease markedly.

Having characterized what Dell consumer customers *prefer*, it is valuable to use the same matrix format to characterize Dell's actual service offerings at the time of the project. Under the existing strategy in 2007, Dell essentially put as much support information on the website as possible, in hopes that customers could self-serve on-line instead of dialing into the call center. Dell also aimed to drive additional revenues by offering the Dell on Call premium service package, giving customers the option of paying for better service, including in-home support

when necessary. Dell did not differentiate between users of various experience levels. That is, based on the information available at the time of a customer contact, neither the agents nor the online web support systems had advanced knowledge of the customer's technical experience. Thus, Dell's approach was to offer both phone and e-support to everyone and hope that customers would self-direct themselves to the most appropriate channel, or better yet, purchase the Dell on Call premium package. This strategy is illustrated in Figure 3 below, with the stripes representing the dual-offering of call center and online support.

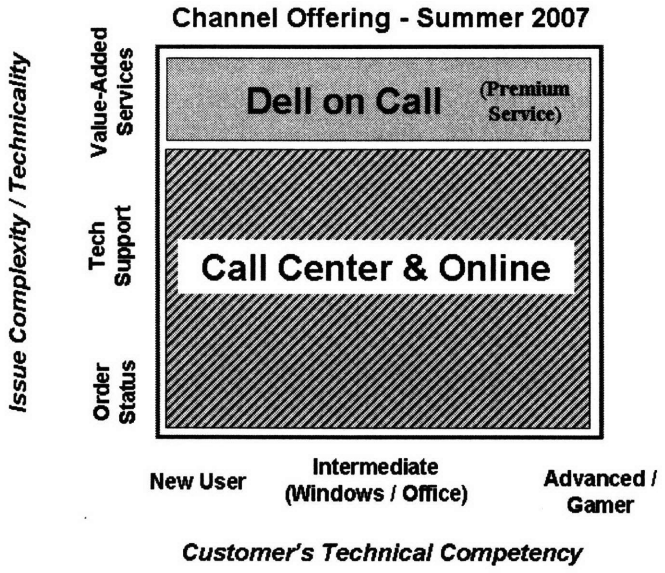

Figure 3: Channel Offerings Matrix

In summary, while there are certainly opportunities to improve Dell's call centers, the Customer's Preferred Channel Matrix (Figure 2) shows that even the best call center in the world will not make every customer happy. Moreover, aggressive attempts to cater to every customer with call centers will only flood phone lines with customers who would prefer to get support through a different channel, thereby increasing hold times and frustrating customers who actually *do* prefer to use the call center for support. The customer channel preference research presented here suggests that substantial segments of Dell Consumer customers prefer online, retail, or in-home service channels over call centers. This observation significantly changes the main question facing Dell Consumer Services today. Instead of asking how to design a call center that

can deliver optimal customer service, the organization must ask how to architect a multi-channel support system that can deliver optimal customer service.

5. OVERVIEW OF LEAN OPERATIONS

The following overview of lean operations is based primarily on the research and publications of James Womack and Daniel Jones, leading experts on the theory and practice of lean. Additional content and perspectives were also drawn from the author's own academic and professional experience.

At its core, lean is a methodology that aligns goals, objectives, and resources across an entire organization in an effort to deliver maximum value to customers as efficiently as possible. In their book *Lean Thinking*, James Womack and Daniel Jones state that the philosophy "provides a way to specify value, line up value-creating activities in the best sequence, conduct these activities without interruption whenever someone requests them, and perform them more and more effectively."[13] Lean is most often associated with the manufacturing arm of a company, primarily in the automobile industry, having gained early respect and recognition as a key component of the renowned Toyota Production System. Today, however, managers in virtually all industries and functions are applying lean theory, principles, practices, and tools to extract more value out of their operations. This chapter provides a general overview of the goals and objectives of lean to establish a common conceptual model for the lean operations philosophy, as it will be used extensively throughout the analysis and recommendations presented in this thesis.

5.1. Lean Fundamentals

The lean approach to management and operations is founded upon a concise set of key tenets. Each of the key tenets represents a fundamental principle of the lean philosophy, and each is equally important to the successful application of lean to any operation. Following is a brief discussion of each key tenet.

Focus on Value to the Customer – Lean evaluates every part of an operation from the customer's perspective in order to differentiate between value-added and non-value-added activity. Any process step that does not add value to a product or service is classified as non-value-added, or waste. Lean managers strive to eliminate waste from operations in order to increase the value-

[13] Womack, James and Daniel Jones. Lean Thinking. New York: Simon & Schuster. 1996. 15.

added yield of a given process. The ultimate objective of lean is to maximize value for the customer. Lean theory asserts that enterprise value will follow from making customer value delivery a first priority. Womack and Jones agree, claiming, "Lean thinking therefore must start with a conscious attempt to precisely define value...through dialogue with specific customers."[14]

Continuous Flow – In addition to minimizing waste, lean strives to achieve a smooth, seamless flow of product and processes. Often referred to as "Just In Time", continuous flow is commonly described as having the right part at the right place in the right quantity at the right time. Proponents of continuous flow (also called single piece flow) claim that it reveals additional waste reserves previously hidden by excess inventory and safety stock. In their book, Womack and Jones maintain that "Getting value to flow faster always exposes hidden muda in the value stream. The harder you pull, the more impediments to flow are revealed so they can be removed."[15]

Simplicity – Lean companies are not fueled by complex processes and procedures, but rather by operating with an elegant simplicity that can be embraced at all levels of the organization. Lean process engineers strive to minimize waste and achieve continuous flow using features such as built-in error detection and visual cues, rather than "over-solving" a problem by designing a complex technical solution.

System-level Thinking – Lean encourages a company to take a holistic view of its enterprise in order to truly understand the end-to-end value chain of the firm's operations. To that end, lean process engineering requires a company to understand every link in the value chain, from its suppliers' suppliers to its customers' customer, before embarking on any process improvement efforts to specific links in the value chain. Companies beginning their lean journeys will often eliminate waste from one segment in the value chain, only to have it resurface at an earlier or later stage. Thus, understanding the entire value chain enables companies to manage the upstream and downstream effects of any lean process changes they implement. According to Womack and Jones, "Reengineers often stop at the boundaries of the firm paying their fees, whereas major breakthroughs come from looking at the whole value stream."[16]

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[14] Womack & Jones, 19.

[15] Womack & Jones, 25.

[16] Womack & Jones, 24.

Continuous Improvement – A final tenet of lean philosophy is the relentless pursuit of "perfection through endless steps"[17]. Integrating the principles and practices embodied in the four tenets described above, lean companies make a continuous effort to eliminate waste from every link in their value chains, driving continuous improvement at both a micro and macro level. Thus, while it is important to perfect specific activities within the value chain, it is equally important, if not more so, to invest resources into perfecting the macro-level organization of the value stream. Womack and Jones term this macro level approach the "radical path to perfection", as opposed to the "incremental path" of improving specific activities.

5.2. Expected Benefits of Lean Operations

While the core objective of lean is to deliver value to customers, the obvious rationale for such efforts is to deliver value to the firm. Companies derive numerous benefits from implementing lean operations such as cost savings, increased revenues, and improved employee morale. This section provides an overview of the main benefits companies have enjoyed by applying lean principles to their manufacturing operations, as well as how those benefits could potentially translate in a services environment.

Elimination of Non-Value Added Activities – Perhaps the most popular benefit of lean is the elimination of non-value added activities. By carefully studying the end-to-end value chain of an operation, lean engineers can increase the efficiency of a process by removing waste from the system. Common examples of waste reduction include designing new workstation layouts that make tools more accessible, and streamlining processes by eliminating redundant activities. It is important to note that eliminating waste is not always a cost-saving exercise to reduce the size of the workforce, but rather a revenue generating exercise to increase the efficiency of the workforce. Research and benchmarking suggests that converting a traditional operation to a lean enterprise can double labor productivity, while also reducing inventories by 90 percent.[18] Translated into a services environment, examples of waste reduction might include eliminating transfers in a call center, or reducing hold times.

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[17] Womack & Jones, 91.

[18] Womack & Jones, 27.

Reduced Cycle Times – By eliminating waste from a system, lean enables companies to significantly decrease cycle times. In fact, Womack and Jones believe that the most immediate and apparent benefit of applying lean thinking is a dramatic reduction (90% or more) in cycle times.[19] Ideally, lean processes only include those steps that are required to deliver value to the customer. Thus, lean processes are naturally shorter and faster than their competitors. For example, Dell applied lean principles in its factories and achieved industry leading cycle times for building custom computers. Shorter cycle times give companies the speed to bring products to market more quickly, and the flexibility to respond to demand changes more effectively. In a services environment, reducing cycle times would mean, quite simply, resolving customers' issues faster.

Quality Improvements – Because lean principles stress the importance of "Quality at the Source", an inevitable boost in quality and control flows from any successful lean process improvement. Lean stresses the importance of building quality in at every step of a process, versus "reviewing quality in" by conducting formal inspections at the end of a process. Simplifying product flows and shortening process cycles also reduces the potential for error, thereby increasing quality. Moreover, because lean encourages the use of visual performance indicators throughout a workspace, employees often develop a stronger sense of personal accountability for their work. This newfound sense of pride and ownership in turn drives incremental quality improvements across the value chain. Research suggests that errors, scrap, and on-the-job injuries are typically cut in half following a successful lean transformation of a company.[20] In a services environment, lean could improve quality by ensuring issues are resolved the first time a customer contacts Dell. Lean also encourages feedback loops, which could potentially provide feedback to product developers to help improve the quality of future products.

Realized Employee Potential – Lean encourages managers to empower workers to continuously look for opportunities to improve their specific link of the value chain. Without a doubt, front line workers understand the intricacies of their products and workflows better than anyone in the company. They have extensive visibility into process pitfalls, and are thus well positioned to conceive simple, yet high-impact, improvements. Lean extracts this untapped value reserve by

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[19] Womack & Jones, 24.

[20] Womack & Jones, 27.

encouraging front line workers to think beyond rote tasks and instead propose innovative ways to improve a process, workspace, or product. The results can be surprisingly rewarding for all stakeholders. Additionally, asking workers to provide input and recommendations into their job roles promotes a sense of respect between managers and employees that in turn boosts morale throughout the organization. In a services environment, lean could extract unrealized employee potential in numerous ways, such as giving agents the opportunity to propose enhancements to their desktop tools, telephone infrastructure, and customer management systems.

Better Customer Experience – As a result of the many internal benefits outlined above, external customers benefit as well. After all, cost reductions, quick cycle times, and better quality combine to deliver a better customer experience in addition to benefiting the company internally. Dell redefined the customer experience with its direct model of selling, building, and delivering computers. Unlike operations on the manufacturing floor, customer service operations involve direct communication and interaction with the customer, making each service contact a critical input into the customer experience. Ideally, lean customer service would provide a customized, timely, and quality resolution to a customer's issue, thereby maintaining the same positive customer experience that was delivered during the sales, manufacturing, and delivery stages of the value chain.

5.3. Tactical and Strategic Aspects of Lean

The original question posed for this thesis project was, "How can lean principles be applied to improve the delivery of customer service?" To effectively answer this question, it is important to differentiate between two critical aspects of building a lean enterprise. The first, and most common, aspect involves the tactical application of lean methodologies to improve operational performance. Within Dell Consumer Services, tactical lean improvements might involve streamlining the scripts used by call center agents, or reducing the number of mouse clicks required to reach a desired page on Dell's support web site. Tactical lean improvements work within the current enterprise architecture to enhance performance of specific elements of the system. Thus, while tactical applications of lean improve the local performance of a particular module, they do not actually change the architecture of the system itself. Conversely, the second aspect of building a lean enterprise has to do with the strategic application of lean to the enterprise architecture of an organization. A relatively unfamiliar term for some audiences, the

concept of enterprise architecting is gaining publicity in industry and academia. An enterprise architecture can be described as, "the fundamental organization of a system embodied in its components, their relationships to each other and to the environment and principles guiding its design and evolution."[21] An alternate perspective proposes that an enterprise architecture "relates organizational mission, goals, and objectives to work processes and to the technical or IT infrastructure required to execute them."[22] In addition to exploring tactical applications of lean for a specific component, organizations must also evaluate their enterprise architectures from a strategic lean perspective. In other words, an organization must determine whether the fundamental architecture of its enterprise is positioned to deliver maximum stakeholder value. When designing, or redesigning, an organization, architecting the enterprise is a critically important task. Enterprise architecting, as a verb, can be defined as, "Applying holistic thinking to design, evaluate, and select a preferred structure for a future state enterprise to realize its value proposition and desired behaviors."[23] In the case of Dell Consumer Services, the strategic application of lean enterprise architecting involves a high level evaluation of the current support channel offerings and their adequacy for meeting consumer customer needs.

At the start of this project, Dell Consumer Services was primarily concerned with identifying and executing tactical lean process improvements in the call centers. Early stage efforts to make tactical lean process improvements in the e-support channel (support.dell.com) were beginning to gain momentum as well. These efforts were beneficial to an extent, but a larger strategic question remained unaddressed. Specifically, no one was questioning the fundamental architecture of the support channels offered to Dell Consumer customers. In order to fully realize the numerous benefits of lean described in the previous section, one must take a holistic approach to applying lean principles both tactically and strategically to an organization. Chapters Six and Seven illustrate this point using a formal case study of the application of lean enterprise architecting principles to the Dell Consumer Services organization.

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[21] IEEE P1471

[22] Nightingale, Deborah & Donna Rhodes. "Fundamental Concepts for Architecting". February 2008.

[23] Nightingale & Rhodes, 2007.

6. STRATEGIC APPLICATION OF LEAN IN A SERVICE ENVIRONMENT

Before launching aggressive tactical lean initiatives within Dell's call centers, it is important to step back and examine the adequacy of Dell's underlying support channel architecture in meeting Consumer customer needs. Without taking this system level approach, companies run the risk of optimizing a sub-optimal process, which can lead to a false perception of "local" success without ultimately delivering system-wide value. This chapter explores the challenges of architecting a lean enterprise within a services environment, and presents strategic recommendations for building a lean enterprise at Dell Consumer Services.

6.1. Defining & Delivering Value in Dell Consumer Services

Virtually all customers use a common system for valuing the performance of Dell's manufacturing division. Simply stated, customers want Dell's factory to build a quality computer, deliver it quickly, and minimize cost. Thus, new users, college students, and IT professionals alike all agree to a common set of values on the manufacturing floor: speed (cycle time), quality and cost. However, as discussed in Chapter Four, Dell Consumer customers define the ideal customer *service* experience in many different ways. This is a direct result of the fact that different customer segments use vastly different value systems to appraise the performance of service and support. In order to evaluate Dell Consumer Service's support channel architecture from a lean perspective, it is imperative to first establish a clear definition of value for each key segment of Dell Consumer customers. As Womack and Jones put it, "Specifying value accurately is the critical first step in lean thinking. Providing the wrong good or service the right way is muda."[24] To be financially stable, however, the optimal channel architecture must account for the two-way value exchange between customers and the enterprise. Thus, the following tables summarize both the general value expectations of key customer segments, as well as their respective value contributions to the enterprise. These assessments are based upon extensive reviews of direct customer input submitted to Dell's "IdeaStorm" website (dellideastorm.com), as well as on customer feedback surveys administered following call center or web support contacts.

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[24] Womack & Jones, 19.

Value / Service Expectation	Customer Segment	Value Contribution
• Full-service • Face-to-face, high-touch • Education • Reassurance • "Hand-holding" • Clear Communication • No "tech speak"	New / Beginner Users	$$$ • Driven by need, thus willing to pay for higher service level • Enroll in training course • Repeat business, referrals

Table 3: New / Beginner User Value Exchange

Value / Service Expectation	Customer Segment	Value Contribution
• Quick access to agent • Capable agent • Clear communication • Short hold times • No transfers • Free of charge • User-friendly on-line content • 24 hour support	Intermediate users	$ • Willing to pay for convenience of higher service level at times • Repeat business, referrals

Table 4: Intermediate User Value Exchange

Value / Service Expectation	Customer Segment	Value Contribution
• Quick access to information • Ability to self-serve • Ability to bypass agent scripts & engage in highly technical dialogue • 24 hr support • Free of charge	Advanced users	$ • Provide knowledge to community forums • Feedback to R&D • Leads to commercial business accounts

Table 5: Advanced User Value Exchange

Having established specific value expectations for each customer segment, it is important to understand how customers prioritize those expectations in order to design the optimal channel architecture. Thus, customer research was invoked to estimate the relative importance of each value expectation across the three major customer segments under consideration. Results are illustrated in the following diagrams:

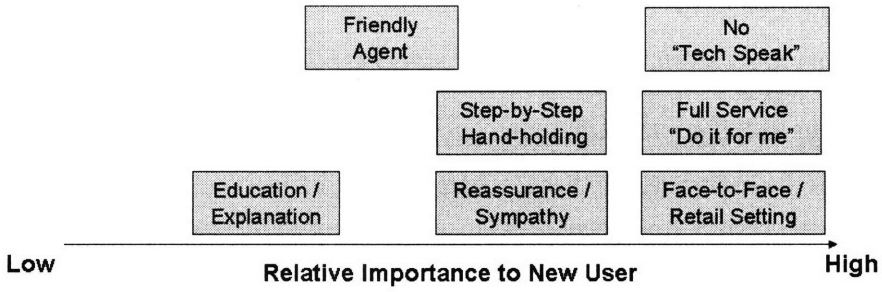

Figure 4: New User Value Prioritization

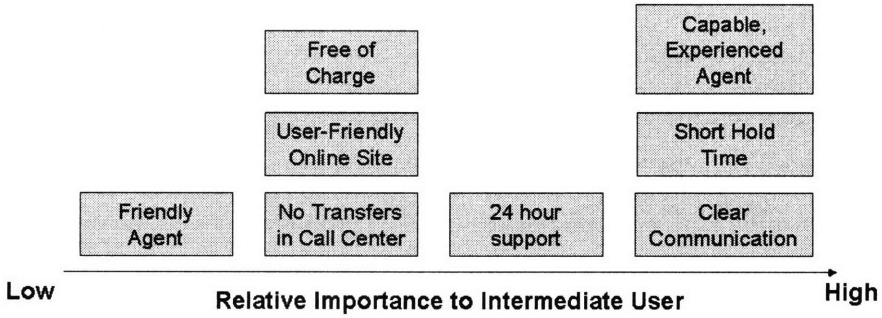

Figure 5: Intermediate User Value Prioritization

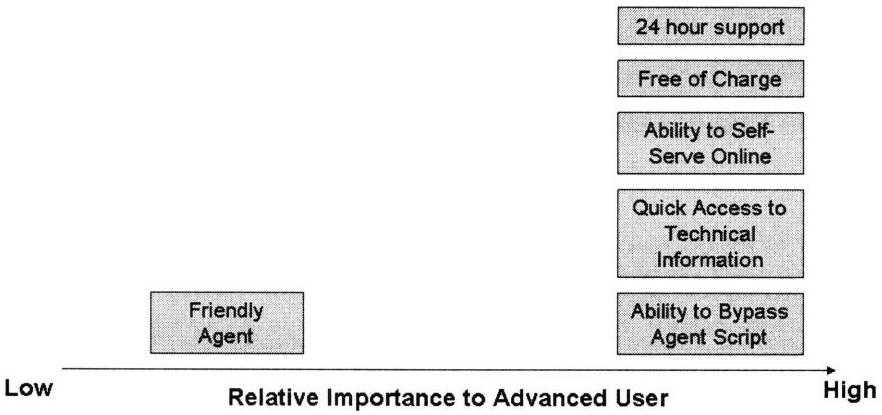

Figure 6: Advanced User Value Prioritization

After reviewing the value exchange tables and value prioritization diagrams for each customer segment, two points stand out:

First, one customer's value is another customer's waste. For example, advanced users find online self-support fast and convenient, while new users find it confusing and intimidating. Moreover, there is even some disparity about value definition within a given customer segment. For example, some intermediate users prefer to have an agent "talk them through" a lengthy solution over the phone for free, while others prefer to pay for the convenience of "outsourcing" the service to a retail provider for convenience. In the exercise above, customers were segmented according to technical experience. However, customers could also be segmented by financial position or even personality type. Regardless, the fact remains that no single value system applies to every customer, which introduces an interesting challenge to designing a lean services enterprise.

Second, Dell Consumer Services has opportunities for improvement across all customer segments. Under the current channel architecture, each group has unmet value expectations that could potentially be addressed through performance improvement investments. For example, new users value the option of getting face-to-face support in a retail setting, but currently this service is only provided at large scale by Dell's competitors. Additionally, intermediate users value the ability to trouble shoot simple issues online using Dell's web support pages. However, the current sea of content at support.dell.com can be difficult to navigate, and written at a level of technicality that renders it ineffective to users without advanced training. Finally, advanced users value the option of speaking with highly skilled agents who can freely discuss complex technical issues. Some phone agents may not be as experienced as Dell's most advanced customers, and thus dependent upon pre-determined diagnostic scripts to troubleshoot issues. Obviously there are many areas in which Dell Consumer Services is doing well, as evidenced by the numerous positive ratings, comments, and feedback submitted on customer satisfaction surveys. Nonetheless, "the squeaky wheel gets the grease" so to speak, such that unsatisfied customers must be managed in a timely, effective manner. To that extent, there exist numerous opportunities for improvement within Dell Consumer Services, as the next section will explore.

6.2. Interpreting Results of Value Delivery Gap Analysis

At this point, we have established what Consumer customers value, and how well Dell is delivering that value. Thus, the next question at hand is what Dell Consumer Services should do about the situation. The answer to this question depends not only on the value expectations of each customer segment, but more importantly upon their value contributions, as outlined in the value exchange tables in section 6.1. Based upon these value contributions, one can determine how to optimally allocate investments to improve value delivery to each customer segment. After all, it makes sense for Dell Consumer Services to prioritize value delivery to those customers who contribute the most value to Dell in return.

The value exchange tables clearly show that each customer segment contributes considerable value to the enterprise, although certain segments contribute more *dollar* value than others. In attempting to prioritize these value contributions, it is important to consider the short and long term effects of each customer segment's contributions to the end-to-end value chain at Dell, Inc., not just to Dell Consumer Services. Collectively these value contributions form a system of reinforcing loops that ultimately justifies investment in service improvements for all customer segments. Below is a high-level system dynamics model of the value contributions of Dell Consumer customers, followed by a discussion of important implications and conclusions.

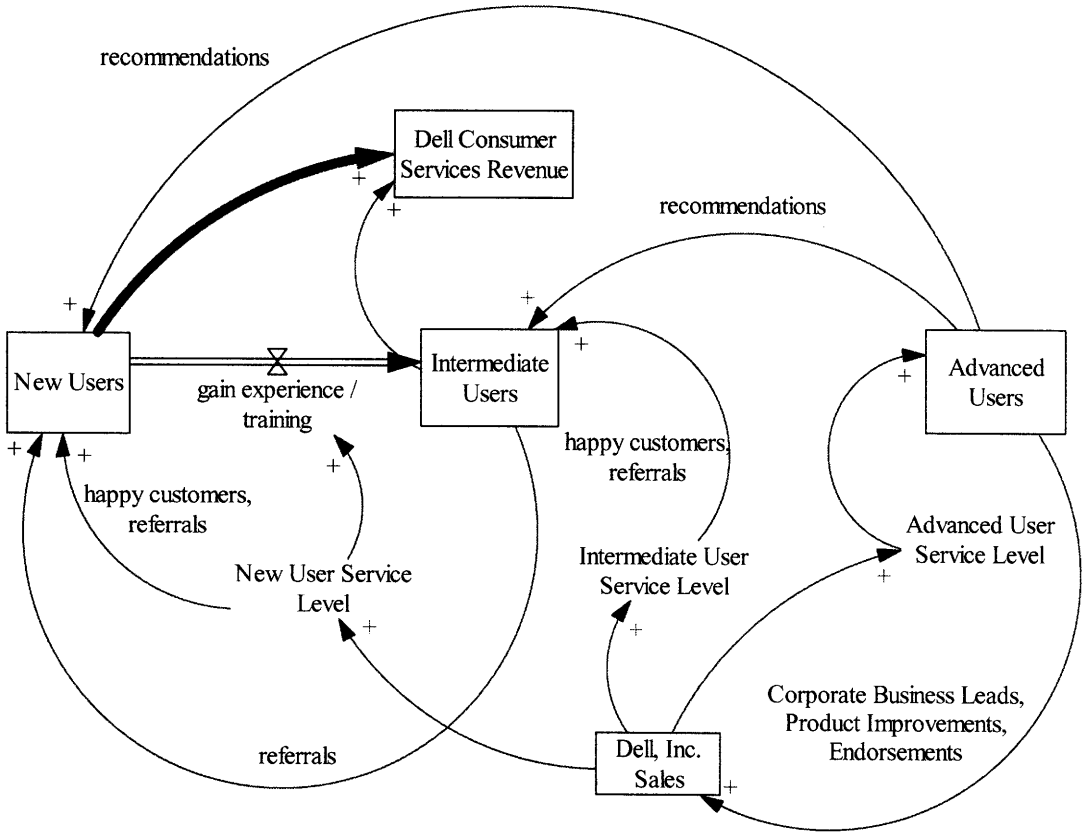

Figure 7: Dell Consumer Value Exchange System Dynamics

New and inexperienced users represent the greatest source of monetary value to Dell Consumer Services because these customers are more willing to pay for higher levels of support and additional training or assistance. Moreover, these users often have friends or acquaintances that are also entering the personal computer market for the first time. Thus, if satisfied with their service experience, new users provide powerful network externalities by referring friends and colleagues to purchase new Dell products. Intermediate users may put a lower value on support from a dollar per customer standpoint, but still represent an important value stream to Dell as a company. While it is true that these customers are much less likely to pay for higher service levels out of need, they are nonetheless willing to procure such services out of convenience at times. Moreover, they represent a major revenue stream for Dell on the sales side, in the form of repeat business and referrals. The fact is, last year's new customers are this year's intermediate customers. While they may not spend as much on service as they did in their first year, it is crucial to provide them with satisfactory levels of service in order for Dell to retain their business going forward. Finally, one must consider the contributions of the advanced users. These customers are the least likely to spend any additional money on technical support. Even so, they provide three unique sources of value to Dell Consumer Services because of their expertise and interest in the computing industry. First, these customers are active contributors to on-line communities, wikis, blogs, and other forums that help support Dell customers around the world. They often have technical expertise that meets and exceeds that of agents employed at Dell or any of its competitors. In a sense, they serve as an extension of Dell Consumer Services by contributing to the worldwide knowledge base of technical support. Advanced users include programmers, computer gaming experts, corporate IT administrators, and most importantly – people who love computers. Thus, they contribute a second source of value to Dell research and product development by submitting ideas for enhanced features, new products, and technical modifications. These users are constantly dreaming of ways to improve Dell's products and services, which is a high value contribution in its own right. Finally, as experts in their field, advanced users are constantly providing advice and recommendations to friends, colleagues, and on-line community forums. A good word from an advanced user carries a great deal of weight with a new user. And since new users spend the most money on services, it makes good business sense to appease advanced users so that they will refer more new users. It is critical to note, however, that this benefit comes with a high risk. Advanced users can tarnish Dell's brand just

as strongly as they can promote it, perhaps even more so. A positive vote from an advanced user in a consumer review article might cause new customers to consider purchasing a Dell, while a negative vote could cause customers to ignore Dell entirely. Moreover, the cause and effect relationship between Dell's service delivery and advanced user opinion is likely to be asymmetrical. That is, it could take several very positive service experiences to win an advanced user's confidence, but only a single mildly negative one to lose it. The delicate nature of this relationship combined with the powerful impact advanced users can have on new user behavior reinforces the importance of meeting advanced users' service and support expectations.

In summary, ensuring steady growth of Dell Consumer Services and the broader Dell Inc. requires investment in service improvements across all Consumer customer segments. As illustrated by the system dynamics model, delivering service value to each customer segment is a sound investment that ultimately drives revenue generation and expands market penetration.

6.3. Strategic Recommendations for Dell Consumer Services

After defining customer value systems, assessing value delivery performance, and modeling the value exchange system between customers and the enterprise, it is now possible to develop strategic recommendations for transforming Dell Consumer Services into a lean(er) enterprise. Generally speaking, one must design a support channel architecture aligned with the needs and values of all relevant customers in order to optimize value delivery according to the value exchange model. In the case of Dell Consumer Services, the answer is quite clear. The optimal support channel architecture requires a diversified mix of online, call center, retail, and in-home channel options. Naturally, some companies may be able to cover all bases with one or two channels only, depending on the characteristics of their customer base. Dell's situation is somewhat unique due to its vastly diverse customer base, and the immense variability in how those customers value service. Certainly, companies playing to niche markets would have much greater alignment of value systems among customers.

Nonetheless, as the value exchange system dynamics model suggests, each Consumer customer segment is critical to Dell's success, and thus each warrants investment towards improving value delivery on the services front. This conclusion leads to some serious strategic implications for the Dell Consumer Services organization by challenging the fundamental architecture of its current support channels. The basic infrastructure for phone support is already in place via the

current network of call centers. However, Dell should continue enhancing its infrastructure for web support to be on par with leading providers of web-based support such as Fed-Ex or Amazon.com. Most importantly, the infrastructure for retail support is just beginning to be built out this point. Be that as it may, a large percentage of Dell's Consumer customers place tremendous value on the retail channel, and Dell cannot afford to leave their needs unmet. Thus, Dell has recently announced that it will be providing new service offerings for customers who buy through retail.

In summary, the strategic application of lean requires a service organization to reconcile the voice of the customer with the voice of the business and define a support channel architecture that optimizes value delivery to all stakeholders. Based on the value exchange analysis conducted during this project, it is clear that Dell Consumer Services must expand and improve its support channel offerings, namely in the retail and online space, in order to meet customer expectations and provide the first rate customer experience Dell, Inc. strives to achieve.

There are numerous ways to execute the strategic architecture outlined above. For example, Dell could open full-service branded retail stores, build a network of smaller service-only branches, or partner with current retailers as a "store within a store" model. Similarly, improving the online support channel could be an internal development effort, or an outsourced operation. These execution decisions and their associated operational logistics designs are all *tactical* questions to be addressed using the lean enterprise toolkit. What matters most is making sure to identify the right strategic support channel architecture *before* diving into the tactical lean operations of a specific channel. Having established a lean channel strategy for Dell Consumer Services, it is now appropriate to explore the tactical execution of lean operations within a specific channel.

7. TACTICAL APPLICATION OF LEAN TO RETAIL SERVICE CHANNEL

The latter half of this research project focused on the tactical lean process improvements that enable each support channel to make the best contribution it can to the enterprise system as a whole. For the purpose of this study, the Author chose to concentrate on the retail arm of the strategic channel architecture proposed in the previous chapter. Following is a case study in the tactical application of lean to the retail support channel.

7.1. Favorable Climate for the Retail Service Channel

At the time of this project, Dell was actively forging out of its traditional online comfort zone and into the retail market. Initially, Dell's desire to enter the retail channel was driven by the need to boost *sales* by competing head to head with leading brands available at consumer electronics retailers. Nonetheless, with the increasing popularity of *services* such as Best Buy's Geek Squad and Apple's Genius Bar, Dell also hoped to compliment its retail sales launch by offering retail support. After announcing an intention to enter the retail sales channel, Dell made good on its promise in June, 2006 by opening a flagship retail store in the upscale Northpark Center in Dallas, TX[25]. In addition to an attractive sales floor showcasing the latest Dell products, the retail store also included a service center similar to the Geek Squad and Genius Bar operations. In 2007, Dell continued its retail journey when it began distributing a standard line of personal computers in Wal-Mart stores. Moving into the retail world was a major change for Dell, but the organization embraced the new direction with a positive sense of enthusiasm and excitement. The concept quickly gained momentum, and employees in all divisions were eager to get involved in the retail program. With the launch of the Wal-Mart partnership and rumors of impending deals with other retailers, it has become very evident that the retail sales channel will be a part of Dell's future[26]. This means Dell will need to develop a solid retail service model to accompany that move. Thus, in the spring of 2007, the retail program had the financial and

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[25] Szalay, Christine. "NorthPark Center Proudly Introduces Four Stores that are a First in the Country". 1 June 2006. <http://www.northparkcenter.com/press_release/060106.html>

[26] Dell Press Release . "Dell Focuses on Direct and Retail Business". 30 January 2008. <http://www.dell.com/content/topics/global.aspx/corp/pressoffice>

cultural support of the organization, as well as a flagship store and service center in which to pilot new ideas. These favorable circumstances made the retail service channel an ideal candidate for a lean retail services case study.

7.2. Overview of the Dell Direct Store's Retail Service Center

The goal of this case study was to charter the development of a standard model for lean retail service operations that could be replicated in line with Dell's retail expansion strategy going forward. Working within the strategic lean channel architecture presented in Chapter Six, the Author took a tactical approach to applying lean enterprise principles to the specific operations of the retail service center at the Dell Direct Store (DDS) in Dallas, TX. For reference, the following diagram provides a high-level overview of the ideal DDS sales and service operations.

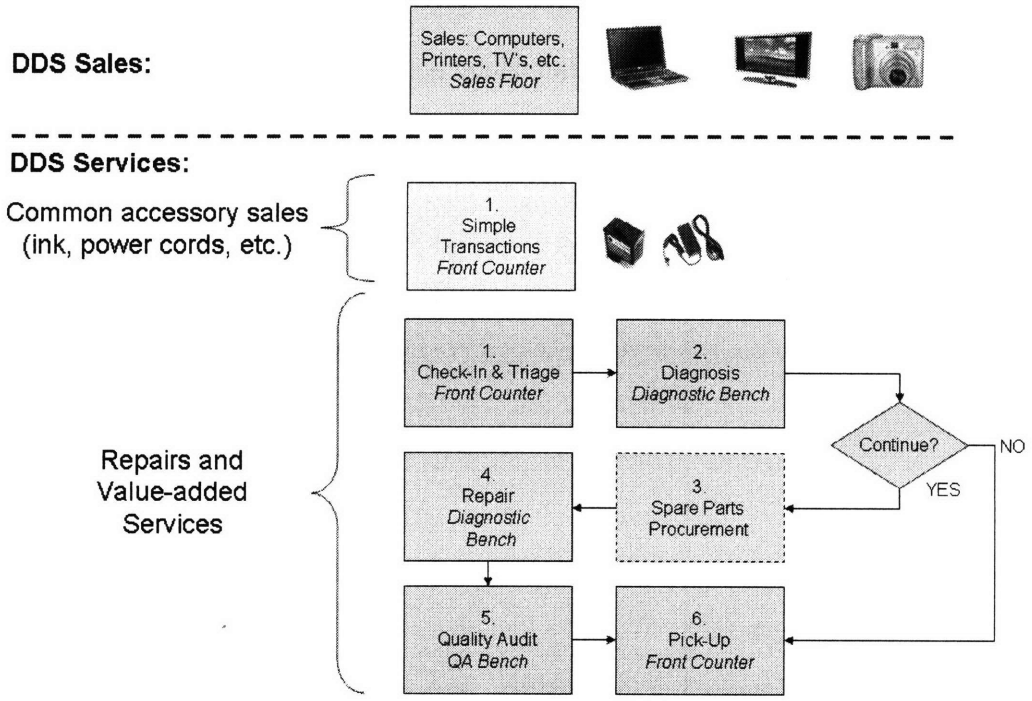

Figure 8: High-Level View of Ideal Dell Direct Store Retail Operations

As shown in Figure 8, the Dell Direct Store served as a sales channel for a variety of Dell computer and entertainment products. Additionally, the store housed a service center where customers could purchase common accessories as well as bring in systems for service.

The primary flow of a system through the service center began at the front counter. Here, a customer service agent would gather basic information from the customer in order to identify the system and understand the issue. Next, the system would be transferred to the diagnostic stage, where a technician would troubleshoot the issue and determine a recommended course of action. Upon customer approval, a repair technician would order replacement parts (if required) and repair the system. Finally, technicians performed a quality audit of each system before notifying the customer that the system was ready for pick-up.

In May, 2007, the service center employed one manager, one assistant manager, four customer service agents, and six service technicians. The service center is open Monday through Saturday from 10am until 9pm (2 shifts), and Sunday from 12 – 6pm. For additional context, it is worth noting that the Dallas Business Journal describes the Northpark Center as the "dominant super-regional shopping center of choice among upscale shoppers in the Dallas Metroplex".[27]

7.3. Value Stream Mapping the Retail Service Channel

After meeting with the store managers and studying the organization's performance to date, three basic goals were established for the retail service center lean operations project:

1. Reduce turn-around time for system repairs
2. Increase profitability
3. Maintain excellent customer satisfaction rates (>85%)

The managers believed that applying lean tools and principles would enable them to drive both short and long term progress towards these goals. As with any lean process improvement effort, the project began by developing a process map of the proposed retail service center operational design. This process map is shown in Figure 9 on the following page. The map highlights challenges that were addressed to reduce inventory and eliminate redundancy in an attempt to make the proposed process design in Figure 9 more accurately reflect the ideal vision shown in Figure 8.

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[27] "Facts and Demographics for Northpark Center & Surrounding Areas". <http://northparkcenter.com/facts.html>

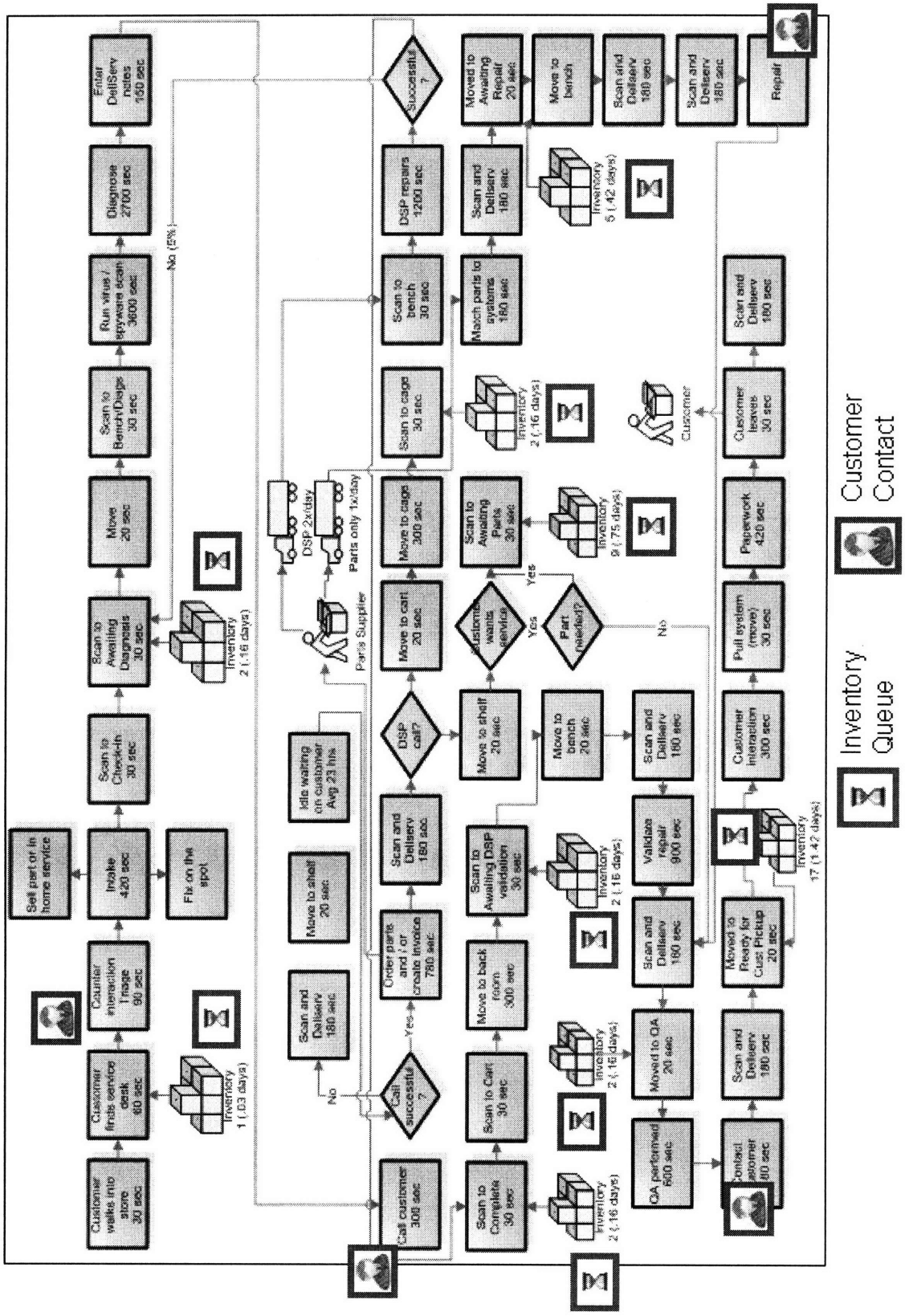

Figure 9: Value Stream Map of Initial Design for Dell Direct Store Service Center Operations, May 2007

Unfortunately, after comparing Figures 8 and 9, it was clear that the initial design of a relatively straightforward process resulted in an operation of elaborate complexity. According to lean protocol, the next logical step was to identify non-value added activities (i.e. "muda") within the process, and work to eliminate them. As discussed previously, there are multiple value systems in play across Dell's customer base. Thus, before attempting to differentiate between value-added and non-value-added activities in this process map, it is critical to characterize the value system held by the primary customers that use this retail channel. The following demographic and financial statistics are helpful in that regard[28]:

- Specialty retail stores and restaurants at NorthPark Center have the highest per square foot sales in the entire Dallas/Fort Worth Metroplex. -Wall Street Journal, 2000 and United Commercial Realty, 2000
- Within a three-mile radius of NorthPark Center, there are 2,188 homes valued at over one million dollars. -United Commercial Realty 2005
- Within a seven-mile radius of NorthPark Center, there are 14,349 households with annual incomes exceeding $250,000. -The Dallas Morning News 2004-2005

Expanding upon these statistics, one can infer that typical patrons of the Northpark Center, and thus the Dell Direct Store, are wealthy individuals who expect high levels of service and professionalism from commercial vendors. From a technical standpoint, they include new and intermediate users, classified as "assistance seekers" inside Dell's Marketing Division. These customers want agents to explain technical issues in a way they can understand, and reassure them that their computer problems can be taken care of. Little things matter to Northpark customers, who are accustomed to "extra touches" such as a complimentary cup of coffee or a free gift during their Northpark shopping experience. Simply stated, the majority of customers approaching the Dell Direct Store service desk at the Northpark Center are willing to pay for someone else to resolve their technical problem, but also expect the highest levels of service and customer care throughout that process.

With this value system in mind, the Author worked with service center staff members to evaluate the as-is process shown in Figure 10. This exercise revealed that the process was in fact compromised by operational inefficiencies and non-value-added activities, including hand-offs,

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[28] "Facts and Demographics for Northpark Center & Surrounding Areas". <http://northparkcenter.com/facts.html>

tedious IT tools, FIFO job prioritization, a lack of standard processes, and a cluttered work space. Such process waste provides a myriad of opportunities for operational improvement by tactically applying lean principles to increase the value yield of the process. For the purpose of discussion, it is helpful to classify each source of waste into four broad categories: People, Process, Technology, and Environment. The following section presents a summary of each category, including examples of process waste, or muda, that were discovered and the counter measure taken (or recommended) to reduce or eliminate the muda sources.

7.4. Eliminating Waste in the Retail Service Channel

People: Several sources of muda related to employee roles, responsibilities, and training were discovered. Initially, the ten available employees were trained and scheduled for one of three possible job roles: customer service representative, diagnostic technician, or repair technician. (See Figure 10) Customer service reps interfaced with customers at the front counter. Diagnostic techs troubleshot issues and determined resolution paths. Repair techs executed resolution paths. Originally, the four employees with the most sales experience were staffed as customer service reps, due to their strong customer management and communication skills. Employees with the most technical experience were staffed as repair techs, due to their thorough knowledge of computer hardware and technical support. The remaining employees served as diagnostic techs, where the main objective was to identify the root cause of the issue, but not actively execute the resolution.

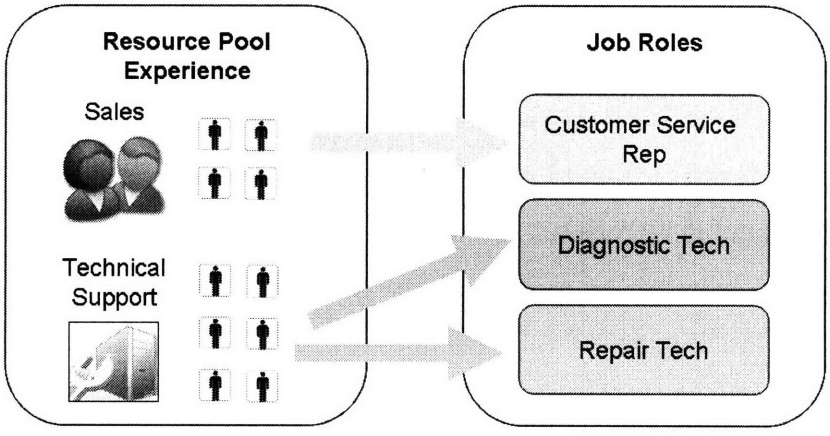

Figure 10: Original Retail Service Center Staffing Model

This model made sense on the surface, but deeper investigation uncovered its flawed logic. While strong customer management and communication skills were important for customer service reps, it also helped to have someone with deeper technical knowledge talk to customers at the front counter. This ensured that all relevant information was collected during the check-in process, thereby avoiding the hassle and waste of calling the customer later to ask more questions. Moreover, agents with strong technical support experience could often solve simple problems on the spot at the front counter, without ever having to bring the system through the full repair cycle. These "quick fix" resolutions not only made customers happy (creating value), but also reduced the workload of the repair center (eliminating waste). Additionally, interviews with each employee confirmed that the most difficult part of the repair process was the diagnostic step. Identifying the root cause of a technical issue requires strong problem solving skills and seasoned technical support experience. Once a diagnosis and resolution plan is established, executing the actual repair can be relatively straightforward. In fact, when given an accurate and clear diagnosis and resolution plan, even employees with the most basic technical knowledge can execute the repair. Thus, rather than use the best technical agents as repair techs, it is much more effective to staff the strongest technical resources as diagnostic techs and customer service reps, and staff the remaining employees as repair techs. The optimized staffing model is illustrated below.

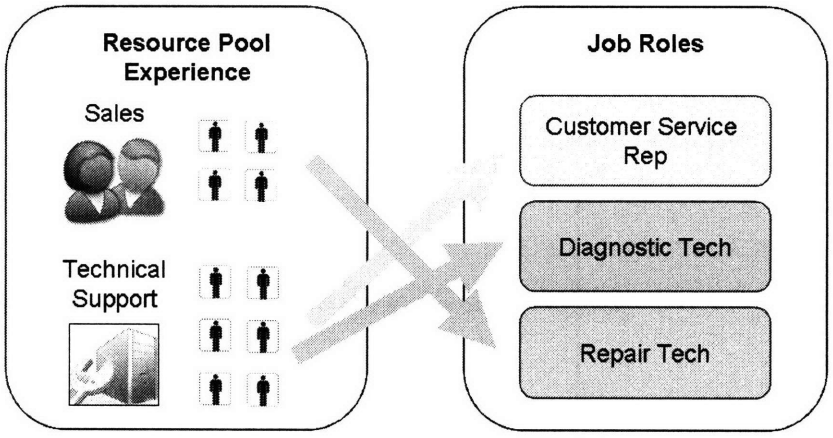

Figure 11: Optimized Retail Service Center Staffing Model

To be fair, some cross training was required to execute this new model. Specifically, repair techs (formerly customer service reps) received abbreviated versions of the training typically given to

new technical support agents in Dell call centers. Similarly, all employees were trained in customer management skills using training typically given to customer care and sales agents in Dell call centers. Regardless of their role, all employees in the retail service center will interface with customers at some point, whether face-to-face at the front counter or over the phone. As such, it is immensely valuable for every tech to have a basic set of sales and positioning skills in order to capitalize on those customer contacts and bring in additional revenue.
The end result was a more flexible resource pool all around. Every employee developed a broader range of skills, and the overall staffing model was optimized to capitalize on the key strengths of each contributor.

Process: The value stream mapping exercise also highlighted several opportunities to reduce waste in the system by modifying the process itself. Examples include:

- Standard Diagnostic Guidelines – In order to standardize the diagnostic process across technicians, a standard set of diagnostic guidelines was created and agreed upon by the diagnostic techs. These guidelines provide specific guidance across multiple aspects of the diagnostic process, including trouble-shooting strategy, customer follow-up, case ownership, job prioritization, and documenting case logs.
- Standard Pass-Down Notes – When responsibility for a system is transferred from one employee to another, employees use "Pass-Down Notes" to communicate important information about the system and case. In order to facilitate smooth hand-offs between employees (e.g. evening to morning shift, diagnostic tech to repair tech), the team agreed upon a standard format and content for pass-down notes. This process change is documented within the standard diagnostic guidelines described above. We note that ideally hand-offs would be eliminated entirely in a truly lean process. Unfortunately however, some hand-offs are inevitable within the constraints of this process, and must therefore be managed accordingly.
- Check-In Form Process – In order to make the front counter check-in process more efficient and aid in managing the customer queue, customers will now have the opportunity to fill out check-in forms *before* reaching the front counter to speak with a customer service rep. Forms and pens should be kept on the table in the waiting area, along with a simple sign informing customers that the first step of the process is to fill out a check-in form. This

process change will expedite the check-in process, and also allows the customer service rep to service customers in parallel. For example, one customer can purchase a replacement battery while another customer fills out a check-in form.

- Quantifying WIP – While the original process enabled managers to tally the number of systems in house at any given time, it did not allow them to quantify the amount of "work" in man-hours that those systems represent. Managers need to know how much work is in the service center in order to effectively manage WIP, overtime, vacation scheduling, etc. Thus, Diagnostic Techs should assign an estimate for the number of hours of work required to fix each system they transfer to a repair tech.
- Emphasizing the ABC's at Check-In – Techs often need to contact customers throughout the repair process, which typically causes delays as many customers are difficult to reach. In order to reduce the need for such downstream customer contacts, front counter service reps will now validate and emphasize three critical pieces of information with each customer in an effort to eliminate the most common causes of downstream customer contacts. This process is informally known as the "ABC's of Check-In":
    - **A**ccess to the system – Be sure to collect all passwords required to access the system and/or any software techs may need to test. If customers are hesitant to provide passwords in writing, suggest that they temporarily deactivate the password function while the system is under the care of the service center.
    - **B**ack-up – Talk to customers about the importance of backing up data. Educate them about the data back-up services offered at the service center. Make sure customers understand that OS reinstalls (if required) will erase all data on the system, and find out what they would like to do about backing up data in the event that an OS reinstall is required to fix their system.
    - **C**ontact Info – Repeat the phone number and e-mail address provided by the customer to be certain techs have an accurate way to contact him/her. Inform customers that they will receive an update within the next four hours. Explain why techs need to be able to promptly contact them with this update - noting that once techs establish a diagnosis, resolution / repair cannot proceed without customer permission.

Technology: Technology plays a key role in the design and execution of all operations at the retail service center. The value stream mapping exercise generated several ideas for innovative ways to leverage technology to increase value creation for customers and employees. Though not executed during the course of this project, these ideas represent powerful opportunities to reduce waste and generate value for multiple stakeholders, and should be carefully considered.

- Remote Repair Via DellConnect – In order to meet continuing demand increase, the service center could explore the possibility of using the DellConnect technology to allow agents outside of the service center to repair systems remotely. DellConnect allows agents to remotely access and take-over a customer's system in order to execute a "virtual repair"[29]. Using this technology, tech support agents in call centers across the globe could potentially contribute to the retail service center's operations, essentially allowing the retail service operation to run 24 hours a day.
- DataSafe – The retail service channel provides a great opportunity to promote Dell's new remote data backup technology, DataSafe[30]. Service Reps could position DataSafe subscriptions at the front counter as either a stand alone product, or in conjunction with another service the customer is purchasing. Executing a full data back-up to external hard drives inside the service center can be prohibitively time intensive. However, if the customer wanted to narrow the initial back-up to a specific folder, then techs could activate the DataSafe subscription and back-up that folder before commencing the repair work. This would enable customers to access data from home even while the system remained in the service center undergoing repair.
- Improving the Asset Tracking Tool – The current tool used to track systems from check-in through pick-up is tedious, manual, and time consuming. It is prone to data-entry errors which ultimately hinders the reporting team's ability to provide accurate and useful metrics to the management team. The team identified several small changes that should alleviate some of the common pain points, and believes these changes could be implemented.

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[29] See www.dell.com/dellconnect for product overview

[30] See www.dell.com/datasafe for product overview

Environment: A final outcome of the lean process improvement project was a complete overhaul of the service center work space from a "5S" perspective. Having invested significant time and energy into improving the people, process, and technology aspects of the operation, it was equally important to address the physical environment surrounding those employees and processes. Using the key tenets of "5S" - Sort, Set in Order, Shine, Standardize, and Sustain - the Author led a large scale effort to retrofit the layout and working environment in the service center to facilitate leaner operations. Major improvements made to the workspace environment included:

- Moved spare parts and accessories from a large, unorganized storage cabinet into individually labeled boxes and shelves. This makes locating products and assessing current inventory levels much quicker and easier. Thus, it helps decrease service cycle time and reduces the probability of stocking out.
- Created a dedicated "break room" for employees to use before and after each shift, as well as during meals and snack breaks. The casual, relaxed environment of the break room helped the team maintain a professional atmosphere in the work space at all times. Food, drinks and personal phone calls were no longer permitted in the work space.
- Completed systems awaiting pick-up were originally stored on a rack inside the service center. This required a service rep to leave the front counter, retrieve a customer's system from the storage rack inside the service center, and return to the front counter to deliver the system to the customer. Significant waiting, motion and transportation waste was eliminated by moving the storage rack to the rear of the front counter area where service reps could quickly locate and return the system in a matter of seconds without ever leaving the front counter.
- Because many repairs require reloading software and operating systems, the service center has volumes of software CD's on hand. Prior to the lean initiative, software CD's were kept in drawers, stacked on shelves, and randomly sitting on workbenches. Moreover, they were often not labeled or kept in protective cases. As a result of these practices, important software CD's were often lost, damaged, or difficult to locate. Some employees chose to "hide" CD's at their workstations to ensure they were accessible when required, which only further compounded the problem. The lean solution to this problem was to assemble a standard set of the most commonly used software CD's and allocate one set of CD's for each

workstation in the service center. Each set of CD's was stored in a protective notebook. Each CD was labeled, as was the pocket in the notebook where it was stored.

- The layout of the workspace was redesigned to facilitate easier navigation among the many shelves where systems, equipment, and parts were stored. Specifically, an "island" was created in the middle of the workspace to enable quicker access to the systems and test equipment technicians used most often.
- Finally, the general layout of each individual workbench was standardized throughout the service center. Each workbench was allocated a standard set of tools, manuals, and equipment. Furthermore, these materials were placed in a standardized layout on every workbench. Essentially, each workbench had the same "look and feel", such that technicians felt comfortable, familiar, and productive working from every bench. Standardized workbenches also helped maintain a more organized workspace, as well as call attention to any missing or damaged equipment.

7.5. Quantifying Performance Improvement in Lean Retail Service

Fortunately, the tactical lean process improvements described in the previous section led to measurable benefits, even during the short time horizon of this research project. Recall that the management team set three goals at the beginning of the project:

1. Reduce turn-around time for system repairs
2. Increase profitability
3. Maintain excellent customer satisfaction rates (>85%)

The following graphs illustrate the positive results achieved relative to each of these goals. Note that numerical values on the y-axes have been disguised for confidentiality. Relative performance gains are evident nonetheless.

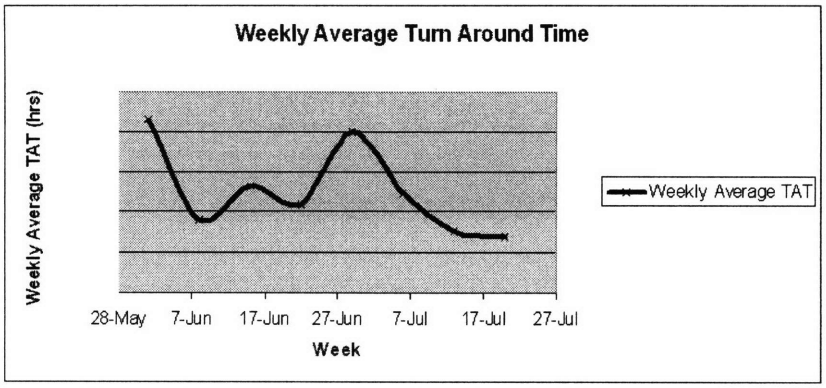

Figure 12: Weekly Average Turn-Around Time for Retail System Repairs

The team saw a marked decrease in turn-around-times following the lean improvement changes outlined in the previous section. There was an abnormal increase in the metric at the end of June due to a series of vacation outages, but performance quickly got back on track and continued to improve throughout July. A key factor in this improvement was the implementation of the Check-In ABC's which drastically cut down on the need to contact customers throughout the repair process, and thus cut down on turn-around time immensely.

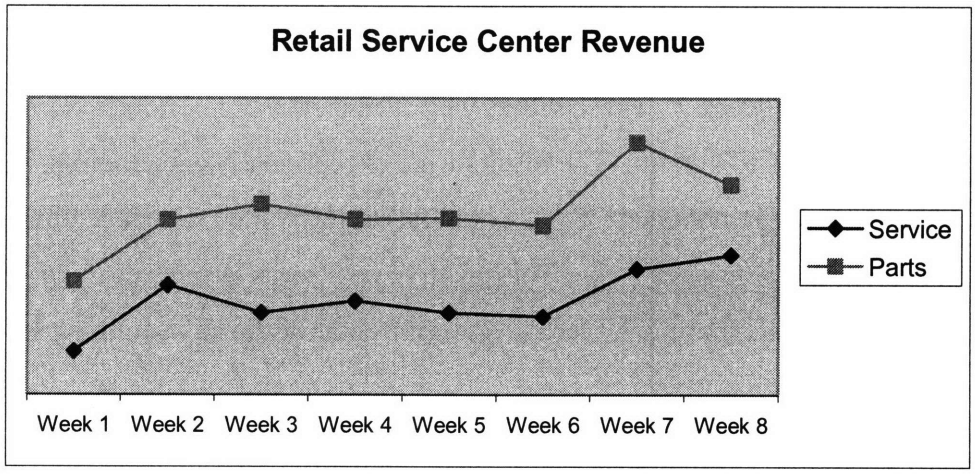

Figure 13: Weekly Retail Service Revenue Streams

The team also saw a positive trend in revenue generation during the course of the lean project. Revenues from parts and accessories increased as employees grew more comfortable applying the skills they learned during sales and positioning training sessions. Revenues also increased from the services stream, which was particularly encouraging. It is important to remember that most systems are still under warranty at the time of repair, so collecting revenue for service

requires "upselling" customers to purchase value-added services such as training or home installations.

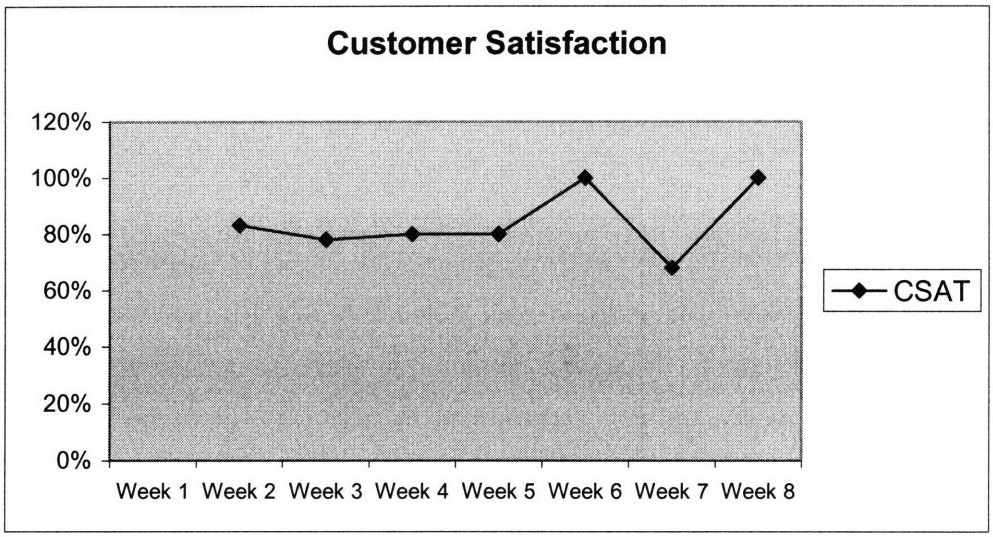

Figure 14: Retail Service Center Customer Satisfaction Scores

Finally, customer satisfaction scores (internally known as CSAT) remained well above the typical scores of Dell's call centers throughout the duration of the lean project, with the exception of one outlier in week 7. These scores were obtained using customer surveys distributed with each repaired system. The results were exceptionally encouraging, as there had been concern among management that CSAT would fall as techs tried to reduce turn-around time and be more aggressive on the sales front. This positive result was largely attributable to the customer management skills training all techs received as part of the cross training effort.

7.6. Summary Remarks

The lean process improvement work described in this chapter introduced positive changes into multiple aspects of Dell's pilot retail service center. More importantly, the lean retail service process was designed such that it could be replicated and implemented in a variety of retail operation scenarios, which might include additional Dell branded stores, stand-alone service depots, or a Dell support center housed within a major retailer. Finally, it is worthwhile to reiterate that these tactical lean process changes are only meaningful to the system as a whole because the retail service channel itself was determined to be a value-added, necessary

component of Dell's strategic lean channel architecture. Far too often, organizations succeed in improving the performance of a particular value chain component, without first assessing the criticality of the component to the value chain's overall mission.

8. CONCLUSION

8.1. Key Project Learnings

This project was sponsored to investigate the feasibility of applying lean manufacturing principles in a customer service environment. Thus, the overarching lesson learned from this exercise is that lean can in fact be applied in a customer service environment, provided the following important conditions are met:

- Specific value definitions for each significant customer segment are established
- The strategic service channel architecture is capable of delivering the value expected by each major customer segment
- Customers can be effectively matched to the most appropriate channel in real time

A critical provision suggested by the research findings is that lean principles should be tactically applied to each channel's internal operations only after the abovementioned requirements have been executed. As stated in the first two criteria, no matter how efficiently a service channel operates, it does little good if it fails to deliver the value customers expect. This is just as true on the manufacturing floor, where it does not matter how efficient a factory is if no one wants to buy the product it produces. Moreover, building on the third criterion, even the most efficient service channel fails if the wrong customers approach it. As an analogous example, it does not matter how efficiently each store in a mall operates if customers do not know which store sells the product they want, and thus approach the wrong store. Therefore, while the tactical application of lean principles can be very important, it is vital to make sure the three principal conditions outlined above are satisfied first.

A second lesson learned from this project relates to the fundamental value potential of service activities in general. In a manufacturing environment, many believe that service and support activities are inherently non-value-added. Proponents of this position argue that if products were produced correctly the first time, then service would not be necessary. This concept is somewhat applicable to the customer service operations studied in this project. For example, if a hard drive did not fail, a customer would not have to call in to have it fixed. This is a fair point in theory,

though realistically we must acknowledge that hardware failures are inevitable, at least for the foreseeable future. Thus, a computer company would be naive not to invest in building effective service and support capabilities to manage and resolve such issues when they do arise. Moreover, some of the service activities studied in this project are not the result of poor quality at all, and are in fact quite value-added. For example, customer training sessions or home installations are not the result of waste in the system. These services deliver value that is needed and requested by customers, and as such these value-added services should be offered as part of any successful customer service organization.

The project also generated several key lessons specific to Dell and its Consumer Services organization. Namely, after working through the strategic and tactical lean exercises described in this thesis, Dell learned that there are gaps between customer expectations and the current offerings of Dell Consumer Services. These gaps exist both in the underlying channel architecture, as well as in the internal operations within each channel. Major gaps identified throughout the course of this research project include the following:

- Many customers value the retail service channel (not currently offered outside Dallas)
- Some customers find Dell's online support pages disorganized and overly technical
- Some customers are frustrated by the one-size-fits-all approach employed by call center agents

Suggested recommendations for addressing these gaps will be discussed in the next section.

8.2. Recommendations

This research project provided valuable insight into the current performance of Dell Consumer Services while also revealing some valuable opportunities for improvement, growth, and change. Following extensive investigation and reflection, the author proposes three main recommendations for the organization to consider going forward.

1. **Introduce a Retail Service Channel** – The voice of the customer has spoken, making it clear that a significant segment of Dell's consumer customers value the option of obtaining service through a retail channel. Competitors are capitalizing on this

opportunity, and Dell cannot afford to forego the option any longer. While the decision to go forth with a retail channel offering may be relatively simple, executing a retail service channel strategy will inevitably be much more difficult. Before making any large, public moves, it is important for Dell to develop a sound, proven, scalable retail service channel model. Once this model is established, it can be replicated across a physical retail network with minimal risk because the standardized model and processes will minimize operational variance.

In the near term, Dell should continue to drive and expand the portfolio of tactical lean operations projects described in section 7.4 at the pilot retail service center in Dallas, TX. By executing and documenting the results of these projects, Dell can establish the standardized retail service model required to penetrate the retail service market effectively. From a management perspective, it would probably be best to add a dedicated resource to champion this effort.

2. **Collectively Manage the Service Channel Portfolio** - Rather than managing each channel individually as a separate service offering, Dell should make a firm commitment to create a collaborative internal Consumer Services environment that integrates service channels with shared goals and objectives. Managers in each service channel should be encouraged to work together to improve overall system performance instead of focusing solely on the results of each channel in isolation. On the customer-facing side, rather than leave channel selection to the customer's discretion, Dell should explore innovative ways to guide customers to most effective channel in a given situation. This might include proactively initiating a chat with customers who pass a certain threshold of time browsing Dell's support pages to prevent frustrated calls to the call center. More importantly, Dell should enhance and develop the capability to transition customers between channels in the event that the customer does not initially choose the optimal channel. Channel transitions should be seamless and efficient, without requiring customers to repeat or re-enter information communicated earlier in the service experience. Down the road, this could entail referring a customer from a call center to the nearest retail service center, and transferring all relevant information to the retail center so that the customer need not re-initiate a case upon arrival.

Essentially, the diversity of Dell's customers and products requires an equally diverse set of service and support options. As such, Dell's goal should be to use its entire array of service channels to deliver personalized service tailored to the customer, just as it manufactures personalized computers according to customer specifications. A recent Forrester Research article echoes this idea, stating, "Organizations today must treat the spectrum of channels as a palette of choices that can be used to paint the customer service experience to best meet a specific customer's specific needs."[31]

3. **Build Stronger Knowledge Sharing Capabilities** - Just as factories manufacture products from raw materials, customer service organizations manufacture solutions from knowledge and information. Essentially, knowledge and information power the "engine" of a customer service organization. Thus, to be an industry leader in this space, Dell Consumer Services must develop the capability to source, process, and integrate knowledge in order to efficiently deliver accurate solutions to customer issues. There are two critical categories of knowledge to consider here: customer knowledge and resolution knowledge. A best practice for most any business is knowing one's customer. Thus, customer knowledge includes everything Dell can learn about a customer, including purchase history, demographic information, technical capability, etc. Improving customer knowledge management would likely require some enhancements to the current IT systems used to manage customer data. It is important for Dell to continually learn more about its customers with every interaction and enhancing its case management system would enable agents to take more ownership of a case from end to end, monitoring a customer's experience throughout the case lifecycle.

   The second category of knowledge powering Dell Consumer Services is resolution knowledge. This category of knowledge includes information related to technical support, order management, financial services, etc. The results of this research project suggest two actions Dell should take to improve resolution knowledge management. First, Dell should accelerate resolution knowledge creation by enabling agents, customers, and suppliers to collaborate and contribute resolution knowledge in web communities, wikis, and other virtual forums. By harnessing the collective knowledge of

[31] Gliedman, Chip. "Trends 2007: eService is Customer Service". Forrester Research. 18 January 2007.

so many experienced contributors, Dell's resolution knowledge would expand and improve exponentially. Second, Dell must ensure that this extensive knowledge base is readily accessible to both agents and customers by developing more effective search engines and diagnostic tools. After all, resolution knowledge is useless if users can not find it. Once resolution knowledge is developed, it should be published to the global community, internally and externally, as quickly as possible. In other words, customers on the outside should have access to the same valuable resolution knowledge as agents on the inside, with a rational level of quality assurance and monitoring, of course.

Simply stated, resolution knowledge helps agents solve problems, while customer knowledge helps agents personalize the delivery of those solutions. Ideally, resolution and customer knowledge would flow seamlessly across all of Dell's integrated support channels, enabling agents to personalize the service experience and resolve issues in a way that best suits the customer. This is a lofty goal indeed, and certainly one that will require financial investment as well as operational and cultural change within Dell Consumer Services.

8.3. Closing Remarks

While this project identified numerous opportunities for improvement within the Dell Consumer Services organization, we did not discover any insurmountable obstacles that would prevent Dell from achieving its long term service level goals. From the author's perspective, Dell is facing some difficult challenges, but it also has the ability to manage those challenges and develop solutions that will ultimately provide a strategic advantage for the broader Dell enterprise. Innovative manufacturing and supply chain practices made Dell an industry leader in its early years, and it is well within reason to expect that innovative service and support practices can carry the company forward with equal success.

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