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The Choice of Choice:
The Perceived Importance of Selection in a Modern Supply Chain

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ABSTRACT

In the field of supply chain management, internal structure and processes are often dictated by the product offering given to the customer. More choice, subsequently leading to more complex supply chain systems, have become the new industry norm. Statements such as, “The customer is always right,” imply that consumer choice is directly correlated with consumer satisfaction and purchasing behavior. Were this not true, and businesses were able to limit stock-keeping-unit (SKU) availability and work towards full automation without impeding upon their top line, the net financial impact could be profound.

This thesis will examine two key concepts that relate human psychology to a company’s supply chain: the importance of choice for consumers and the cost associated with removing this established norm of perceived customization. The impact of this on customer behavior will be used to detail the ways in which supply chain systems can subsequently be optimized and automated. Using Dell Technologies and the automotive industry as a real-world examples, this thesis will serve to prove that offering customers less choice can lead to increased profitability for retailers by reducing their expenses and, potentially, increasing their revenue.

TABLE OF CONTENTS

LIST OF TABLES	iii
LIST OF FIGURES	iv
ACKNOWLEDGEMENTS	v
Chapter 1 Introduction	1
Chapter 2 The Current Consumer Market	5
“Retail Apocalypse”	6
Brand Loyalty	9
Importance of the Internet	11
Chapter 3 Do Consumers Choose Choice	13
Lots of Choices, Little to Choose From	16
Information-Gathering	17
Objective verses Subjective	19
Chapter 4 Supply Chain Optimization Overview	21
Safety Stock	22
Automation	23
BTO verses BTS	25
Chapter 5 Company Analysis - Dell Technologies Incorporated	27
The Automotive Industry	29
Dell: Offering Choice Through BTS	32
Chapter 6 Conclusion	35
BIBLIOGRAPHY	36

LIST OF TABLES

Table 1. Consumer Income and Expenditures	5
---	-------------------

LIST OF FIGURES

Figure 1. Dell Net Revenue Verses Net Income	27
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Chapter 1

Introduction

The scale of Amazon's business volume is stunning. It sells 1,300,000 products every day in the United States alone. Amazon's product offerings encompass 350 million unique stock-keeping units (SKUs). Movement of sales of these units from source to destination exemplifies the textbook definition of a perfect modern supply chain system. They offer their customers the freedom to order nearly anything they want with the convenience to do so whenever they want. If an individual wanted to look at every product they offer, they would have to look at one every second for over eleven years straight. In order to fulfill these orders, which account for one-third of all transactions in the United States, they employ over 750,000 people (Clement, 2020). Within two business days, products can be delivered to one of their 526 physical locations or directly to a customer's doorstep, perhaps even by drone.

It is without question that Amazon is a successful company, and, from this, one would understandably draw two key inferences about the modern consumer they serve: they want a variety of products and they want them quickly.

The latter statement is difficult to dispute. A study conducted by UCLA neuropsychologist Robert Bilder, PhD, in 2007 found that shopping results in brain activity in three different sectors of the brain: the nucleus accumbent, the insula, and the mesial prefrontal cortex. In his study, which examined the impact of a purchasing transaction, he clearly showed that "impulse" shopping was not the norm. The activity the examinees showcased proved the consumer considering the pain associated with cost verses the satisfaction associated with value, leading to their final purchasing decision (Bilder, 2015).

Buying online, as well as buying on credit, led to a reduced perception of immediate cost and, therefore, an increase in relative purchase satisfaction. In short, shopping results in brain activity like other addictive stimulants and online shopping, with its increased ease of use and decreased perceived immediate cost relative to physical retail, is one of the most impactful variants on the market. The easier and quicker it is for a customer to buy a product, the less time they have to feel guilt and the happier they will be with their decision.

The importance of choice to a consumer is more difficult to defend, as this thesis will examine on two fronts. First is whether or not businesses can sustain a business model that relies on choice and speed as its core competencies, often nicknamed the “Amazon Model.” Amazon, despite having a market value of \$886 billion, has an operating profit margin of only 4.27 percent. Although typical for some retail divisions, not many growing businesses could sustain such low margins. Some even speculate if Amazon could still be in business were not for AWS, Amazon’s internal data and ad services division whose profits are 1.5 times more than Amazon’s retail business (“Amazon Profit,” 2019).

Second is whether or not customers value choice to the extent that retailers perceive them to. Customers value the perception of having choice, as will soon be discussed, but the difference between the perception of choice and the reality of making that choice are two very different transactions. In most cases, minus goods reserved merely for pleasure, customers merely desire a product that fulfills their individualized needs. The psychology behind goods purely for entertainment or pleasure will therefore not be covered in this thesis.

This thesis will not imply that choice should not be offered, nor that only top-selling goods should be sold. In 2008, in an effort to eliminate many of their poor-selling products and increase free cash flow, Wal-Mart cut fifteen percent of their SKU offerings based on sales

histories. The result: massive community backlash, seven consecutive quarters of declining same-store sales, and sweeping changes to executive management. Wal-Mart withdrew the effort and, alongside signs reading “It’s Back,” increased per-store SKU levels by eleven percent, or 8,500 items (Bustillo, 2011).

When news of this broke, many perceived this as being a clear indicator of customers wanting more choice. This, however, would be a misevaluation of the root cause of these events. In essence, Wal-Mart looked at their offerings, chose the bottom fifteen percent of items, and cut them from stores. In a perfect world, this would be a fairly logical solution to their cash flow issue. Why, then, did it result in such backlash? Should a majority of customers still not be extremely satisfied with the eighty-five percent top-selling SKUs?

The answer is, in fact, “no” for one key reason. While it is true that customers were upset by being given less choice, it is not because of the actual choices they had. Customers were upset because Wal-Mart cut the bottom fifteen percent of items based on performance alone rather than looking at what specific products they were cutting. This blanket reduction resulted in some product categories, which had one or two top-sellers, being reduced just to those one or two top-sellers. They were upset not by the choices removed or retained, as a majority of customers would have purchased the goods still being offered, but by the perception of choice not being offered at all.

The purpose of this thesis is to further examine this concept by detailing the current consumer market and subsequent customer behavior, including the notion of customers valuing choice. Upon examining ways of making supply chains more efficient through automation, an analysis of companies that utilize both build-to-order (BTO) and build-to-stock (BTS) processes will be used to introduce the real-world potential of the theories detailed in this thesis. Dell

Technologies and the automotive industry will be the primary focus of this section. The thesis will close by making a general recommendation for future consumer product offering mixes.

Chapter 2

The Current Consumer Market

From 2017 to 2018, the average pre-tax income of an American household rose by 6.9 percent, from \$73,573 to \$78,635. As seen in Table 1, expenditures rose by a mere 1.9 percent, with a majority of positive percent changes coming from increased expenditures in personal insurance and securities, at 7.8 and 7.5 percent respectively. Expenditures on apparel, services, and entertainment did increase in net volume but the rate in which they increased was down from years previous. Discrepancies between subtotal and total amounts are accounted for when considering taxation. Overall, households are more prosperous but are spending relatively less on the “luxury goods” usually associated with increased wealth (“CONSUMER,” 2019).

Table 1. Consumer Income and Expenditures

Item	2016	2017	2018	Percent change	
				2016-17	2017-18
Average income before taxes	\$74,664	\$73,573	\$78,635	-1.5	6.9
Average annual expenditures	57,311	60,060	61,224	4.8	1.9
Food	7,203	7,729	7,923	7.3	2.5
Food at home	4,049	4,363	4,464	7.8	2.3
Food away from home	3,154	3,365	3,459	6.7	2.8
Housing	18,886	19,884	20,091	5.3	1.0
Shelter	11,128	11,895	11,747	6.9	-1.2
Owned dwellings	6,295	6,947	6,678	10.4	-3.9
Rented dwellings	4,035	4,167	4,249	3.3	2.0
Apparel and services	1,803	1,833	1,866	1.7	1.8
Transportation	9,049	9,576	9,761	5.8	1.9
Vehicle purchases	3,634	4,054	3,975	11.6	-1.9
Gasoline, other fuels, and motor oil	1,909	1,968	2,109	3.1	7.2
Healthcare	4,612	4,928	4,968	6.9	0.8
Health insurance	3,160	3,414	3,405	8.0	-0.3
Entertainment	2,913	3,203	3,226	10.0	0.7
Personal care products and services	707	762	768	7.8	0.8
Education	1,329	1,491	1,407	12.2	-5.6
Cash contributions	2,081	1,873	1,888	-10.0	0.8
Personal insurance and pensions	6,831	6,771	7,296	-0.9	7.8
Pensions and Social Security	6,509	6,353	6,831	-2.4	7.5
All other expenditures	1,897	2,010	2,030	6.0	0.0

Note: Subcategories do not sum to their respective major item category.

While some of this “wait-and-see” mentality may be based in the ongoing global trade relations discussion and global medical crises, this reduction in leisure spending has been an ongoing trend and, according to market experts, will only worsen. As Bart van Ark, global chief executive of The Conference Board, stated to the Washington Post in April of 2019, “The majority of global consumers do not expect conditions to become more favorable over the next twelve months” (Bhattarai, 2019).

Statistics like this may be interpreted as the “death” of the leisure-driven consumer-market. Theories dispute whether or not this is case, for although brick-and-mortar sales fell 3.3 percent during this period, online retail grew 3.7 percent. Moreover, some decline in brick-and-mortar sales can be directly accounted for when considering self-cannibalization of the market. Take, for instance, Target, who saw comparable store sales decline by three percent in 2016 but Target.com sales grow by over thirty percent in the same period (Ankeny, 2018).

The so-called “Retail Apocalypse” is not a complete myth, however. In 2019 alone, Gymboree, Payless, Charlotte Russe, Diesel, FTD, Charming Charlie, Barney’s New York, Forever 21, and a few dozen other retailers have announced their bankruptcy. Many speculate that the increased choice that online retail provides is the cause, as alluded to in Chapter 1. In the next section, this thesis will analyze the aptly named “Retail Apocalypse” and detail the true reasoning behind it. Following this section, this thesis will then detail the consumer loyalty dilemma and how both brick-and-mortar and online stores are using the internet to combat it.

“Retail Apocalypse”

Bon-Ton, once one of the East Coast’s largest retail chains, recently filed for Chapter 7 bankruptcy. In 2005, they announced they would be doubling in size with a \$1.1 billion cash

buyout of 142 stores previously owned by Saks's Northern Department Store Group. Thirteen years later, they closed after defaulting on a \$14 million interest loan, 1.3 percent of the expansion investment they made just a few years prior. Is online retail solely to blame for such a drastic change in events?

Prior to the rise of online retail, Bon-Ton established a strong customer base by offering goods many customers could not otherwise get in their region, including branded fashion and designer homeware. According to Neil Saunders, Managing Director of GlobalData Retail, "This once made Bon-Ton a focal point and a destination for local shoppers," and, "the internet has done much to change this dynamic" (Patnaik, 2018). Based off of this statement, the answer seems clear: online retail removed the need for a business, such as Bon-Ton, to exist; their core competency, and thus the business model entirely, was doomed.

If this were the case, however, then how do many predominately brick-and-mortar companies continue to thrive? Kohl's, another tier-three department store that appeals to a similar customer base to Bon-Ton, has been able to consistently realize increasing revenue in recent years, including a 0.72 percent growth from 2018 to 2019 ("Kohl's Revenue," 2020). Despite having an online presence that saw an annualized fifteen percent growth, brick-and-mortar sales still accounted for over seventy-six percent of their 2019 net sales (Pohlmann, 2020). The ways in which they accomplished this will be discussed later in this thesis.

The downfall of Bon-Ton was predestined far before online retail was the norm. As early as 2001, Bon-Ton reported annual same-store losses totaling nearly \$2 million. Despite a recovering, post-recession market, "the Christmas season slowed in sales so much that the company dropped their sales expectations to an all-time low" (Votteler, 2003). Net cash flow, however, was on the rise. Their \$1.1 billion expansion, now seen as a mere attempt to maintain

good standing in the stock market, led to them reaching their largest size to date in 2005. The Bon-Ton Brand then owned Bon-Ton, Bergner's, Boston Store, Carson's, Elder-Beerman, Herberger's and Youngers, mainly through leveraged cash buyouts.

And therein lies the root cause of Bon-Ton's, and many others, closure. While it is true that Bon-Ton was faced with declining sales, the reason for their closure was not a lack of profitability. Rather, the late 1900s and 2000s resulted in such unprecedented growth for retail that overinvestment and rapid growth led to immensely decreased fluid cash flow. This, in combination with declining same-store sales and the 2007 - 2009 recession, led many of these companies to default on their debt repayments and be forced into bankruptcy.

In 2018, Bon-Ton filed for Chapter 7 bankruptcy, were bought out for \$775.5 million, and liquidated their remaining 267 stores. Intellectual property was sold later that year for \$900,000. The purchaser of the "Bon-Ton" name recently resurrected it, ironically, as an online-only retailer (Unglesbee, 2018).

The retail shopping space has shown that that a rapid expansion of reach, not a rapid decline in sales, led to the perceived devastation of brick-and-mortar. As noted earlier, commerce is still on the rise, but the relative amount that goes to brick-and-mortar is not. In short, it can be assumed that supply has overstepped demand limitations. This is far from what physical retail experienced just a few years prior.

From 1970 through 1990, 375 million square feet of retail space was built every year. In 2000, well before e-commerce dominated the market, this number slowed in half to 144 million square feet. In 2017, there were still over 1200 malls across the United States, with the top twenty percent of malls generating two-thirds of all mall revenue (Brownfield, 2017). Customer

behavior shifted from physical to online retail and had these companies not overinvested in declining locations, such as malls, when times were good, they would have survived when times were bad.

All of this is to prove the following: retail is not dying. Moreover, retail offers a fantastic opportunity for both preexisting and new brands to invest and grow. These companies should be looking at ways to capitalize on rising opportunities rather than focusing on mitigating the looming risk that goes with market saturation.

Kohl's growth in this space is a clear indicator of the potential that brick-and-mortar provides when "tried-and-true" methodology is ignored. By partnering with Amazon for in-store package returns, as well as a recent initiative to reduce store sizes from eighty-thousand to thirty-five-thousand square feet and reduce inventory by sixty percent, Kohl's has been able to consistently grow in a market that, as a whole, has not (Thomas, 2018). Although physical retail has changed, the potential for companies to capitalize on it is more prevalent than ever. Companies such as Kohl's, who have recently been closing older locations to reinvest in rising markets, recognize this fully.

Another key issue of "old" retail was the overreliance on brand loyalty. Especially after the 2007-2009 financial crisis, customers have been increasingly quality and price focused in lieu of brand conscious, as they had been previously. In the next section, this thesis will detail the important value that brand loyalty, or lack thereof, brings.

Brand Loyalty

Brand loyalty can no longer be relied on for purchasing behavior. Bon-Ton, which was founded in 1898, proves this to be the case. In fact, only nineteen percent of Baby Boomers,

noted for being the generation with the highest disposable income and therefore greatest leisure purchasing potential, note that their customer loyalty has increased in the past five years. This is in contrast to fifty-three percent of retailers who believe customers are more loyal than before (“The Loyalty Divide,” 2018).

Brand loyalty is based on three major considerations: quality of the product, knowledge of the product, and the price of the product. Quality of the product needs little consideration in this piece. Generally, product quality is the underlying belief that if a customer purchases a product and it meets or exceeds usage expectations, they will be more willing to purchase it again. It is something that is still present today, as seventy-one percent of consumers state that product quality is the most important product characteristic (“The Loyalty Divide,” 2018).

Knowledge of a product is what has changed most drastically in recent years. With the increased ease of information access that the internet provides, customers are increasingly knowledgeable of the brands and products they buy with fifty-three percent of all consumers stating that they are “likely” to investigate a brand’s social media before making a purchase decision. In 2017, members of the Bandung University Economics Faculty conducted research that measured the brand loyalty by altering four brand and eight quality variables. By averaging the customer’s final purchasing decision, they found only 23.32 percent of customers were solely “brand” loyal (Demosi, 2017). This is in stark contrast to the eighty-two percent of consumers who state they are product-brand loyal (“Loyalty,” 2018).

Brand loyalty is especially important when considering the elasticity of product demand. With extremely high loyalty, customers are largely inelastic and are relatively more willing to accept price increases. This is largely reserved for major purchasing decisions, or those that equate to a larger proportion of overall financial and social impact. For example, there is little

replacement for a designer purse or a luxury sports car and, as a result, customers are relatively inelastic to price increases.

A majority of products, however, are price inelastic. Although a customer recognizes a potential difference in quality and social recognition, the loyalty associated with it seldom overpowers the impact of financial burden. In this situation, brands turn to the theory of price and product perception. As Harvard Business Review published, “how customers *perceive* the price is as important as the price itself” (Heda, 2017). In addition to price and brand, company image, perception of value, and familiarity of design must all now be considered.

What does this mean for manufacturer and retail firms? Name recognition, and subsequent brand recognition, can no longer be an assumed driver of sales. In order to drive positive imagery and loyalty, companies must strive to become a part of their customers’ lives. The internet, with its close proximity and high usage by a large percentage of the consumer market, has recently become one of the most popular ways to achieve this. Even when firms do not sell product through this medium, the internet offers incredible opportunity for marketing and sales growth, as will be discussed in the next section.

Importance of the Internet

Online retail has recently surpassed brick-and-mortar in sales as a percentage of total GDP consumption, at 11.813 versus 11.807 respectively, for the first time ever (Rooney, 2019). Those aged twenty-seven to thirty-one are more likely to shop online than in-store, noting that “online reviews” and achieving the “best price” are the main drivers in this decision. “Convenience,” though often seen as the main reason why online retail has taken over the

market, was notably absent from the top reasons. Even more surprisingly, those aged twenty-two to twenty-six are still marginally more likely to shop in store (“The Millennial,” 2019).

Due to this purchasing methodology, many brick-and-mortar stores have begun offering the perks of shopping online, such as price-matching and online ratings, for in-store items. Walmart, for example, has begun to implement these previously online-only practices through their cellular phone app and realize the benefits, with their same-store physical retail sales increasing by 3.4 percent in early 2019 (“Walmart,” 2019).

In addition to offering a similar shopping experience to online retail, physical retail has begun to recognize the importance that online, specifically social media, marketing has. Eighty-eight percent of eighteen to twenty-nine-year-olds use social media on a regular basis, averaging 2.5 hours per day. As a result, ninety percent of companies today use social media and seventy-seven percent of them expect their usage to increase this year. Social media ad spending in 2019 is at an estimated \$93 billion, with \$55 billion coming from Facebook alone (Newberry, 2019).

Consumer behavior has changed but the need and desires of consumers has not. Physical retail has been largely unable to adapt to this changing environment, leading to their perceived current detriment. With eighty-one percent of Gen Z saying that they prefer to shop in-store than online, opportunity for recovery and potential growth exist. In the next section, the way in which consumers perceive choice and make their shopping decisions, including their decision-making process and the ways that the internet has impacted it, will be covered.

Chapter 3

Do Consumers Choose Choice?

“Less is More” – Ludwig Mies van der Rohe

The quote above, though initially used to describe the importance of minimalization in architecture, has implications that expand far beyond its intended context. For decades, the American consumer market has been fixated by offering more products without considering how that choice is offered. Furthermore, this increased product offering directly leads to more complicated, and thus more expensive, supply chain systems. Cost reduction projects in the supply chain are the norm, as will be analyzed later in Chapter 4, and most attempt to achieve the following: offer the customer more for less, ship less distance, move less product, break less inventory, and spend less money doing it.

The following question is seldom posed: Do consumers want more choices?

Imagine the following scenario: A customer is shopping for a bottle of shampoo. They have a brand of shampoo that they usually purchase but, as previously mentioned, brand loyalty can no longer be depended on by the manufacturer. The manufacturer’s solution: offer a wide array of varieties and fragrances so that the customer can find *exactly* what they want. Surely this will excite the customer and lead to more sales.

The customer turns into the shampoo aisle and views the selection of shampoos, ranging in brands, sizes, scents, hair types, colors, and more. The customer, overwhelmed by the amount of choice, selects the scent they always do and continues with their shopping. They defaulted to

their pre-established purchasing decision because the overwhelming choice forced them to do so. A dozen or so customers follow suit in similar fashion.

Although fictitious and written to illustrate a concept, the scenario described above is based in more fact than mere fiction. This is the exact situation that Proctor & Gamble faced just a few years prior.

Owning brands such as Head & Shoulders, Olay, Crest, Dawn, Tide, and forty-three others, P&G generates an annualized revenue of \$66.8 billion and has a market valuation of \$313 billion (“Procter & Gamble,” 2019). This includes nineteen brands that have individual valuations over \$1 billion each. Once called their “number one brand,” P&G watched as their staple hair product, Head & Shoulders, began to experience declining sales in the early 2000s.

The reason: they were offering too much choice. As Matt Haig notes in his book, *Brand Failures*, “Did customers really need 31 varieties of anti-dandruff shampoo?”

Since 2012, P&G has undergone a productivity and cost savings initiative, mainly in reducing costs associated with research, overhead, and the supply chain. They found that their customers were being given too much choice, which overextended their brand variety and led to more confusion than more consumption. Their first initiative was to reduce the number of product varieties they sold, maintaining only the highest sellers.

The project was a success, with P&G noting that it has resulted in an estimated \$3.3 billion in annual pre-tax gross savings. Reducing the number of Head & Shoulder varieties from twenty-six to fifteen led to a sales increase of ten percent. Eliminating their ten worst performing cat litters resulted in an eighty-seven percent increase in Fresh Step profitability.

The successes do not end with P&G. The average grocery store in the U.S. offers over 45,000 products whereas the ninth largest globally, Aldi, offers only 1,400. How could offering a consumer *less* lead to *more* sales? Sheena Iyengar, professor at Columbia Business School, explains this phenomenon:

“The value of choice depends on our ability to perceive differences between the options. When there are too many choices to compare and contrast, instead of making better choices, we become overwhelmed by choice, sometimes even afraid of it” (Iyengar, 2017)

Previously, this thesis detailed when Wal-Mart faced a massive backlash when attempting something similar and cutting their product offering by fifteen percent. Why did these companies experience so much success in limiting their customer choice whereas Wal-Mart was forced to reverse it? Wal-Mart had a sweeping reduction in products regardless of category while the companies above ensured that the customer still felt like they were making a choice, even if they technically were not. Whereas P&G removed the poor performing products per category, Wal-Mart removed just the poor performing products. The difference is subtle, but the impact is profound.

Classic Fragrance Head & Shoulders alone makes up 17.8 percent of the entire dandruff shampoo market in the United States. They still, however, offer an array of options for their different customers. They are unique in being able to offer their customers the appearance of many choices but, through deliberate alteration of perception, know what will be sold with alarming accuracy. This concept is one that will be discussed in the following section.

Lots of Choices, Little to Choose From

The choice can be made for a customer without the customer realizing that the choice is being made for them. For this, let us further examine the Head & Shoulders line of dandruff shampoo. Their top selling products are as followings: Head & Shoulders (classic), H&S (2-in-1), H&S (dry scalp), H&S (men / Old Spice®), and H&S (itchy scalp). All these products individually make up at least 2.5 percent of the market, with the top two making up one-third of the entire dandruff shampoo market (“Medicated Shampoo,” 2019). Although seemingly unimpressive, the medical shampoo market had net sales of \$12 billion in 2018 alone. How did P&G dominate this market while simultaneously reducing product offerings?

Medicated shampoos are designed to be used for medicinal purposes. On their website, H&S notes that although safe to use daily, it is intended to be used three times per week for full effect. Based off of this, it can be estimated that the average customer who experiences dandruff will default to the predetermined default option: classic. They do, with this being the top selling medical shampoo.

What will the consumers who do not use it solely for medical purposes choose? Here lies the pre-determination of purchase. According to their website, cold-weather climates lead to a dry scalp and, therefore, seasonal flaking. Based off of this, it can be assumed that H&S (dry scalp) sells better in cold-weather climates. It does. For consumers who are not fiscally strong, it could be assumed that they would opt for the 2-in-1 variant. They do, and with the average H&S customer making under \$20k per year, this is the second best-selling product on the market (“Head & Shoulders,” 2019). The list continues based on geographic region and scent, gender, and more.

What concept P&G is using, and the one that many consumers miss, is that customers do not actually like choice: they merely like the perception of it. They desire being given a unique product with a customized experience. Consumers make a purchase that not only solves an issue, but also solves their issue, as if the solution was tailored to them. In order for a customer to understand what product fits this criterion, they must rely heavily on information-gathering prior to the purchase.

Information-Gathering

In the next section, the theory that consumers want choice but are subjective in their decision-making process will be discussed. This thesis will attempt to prove that consumers give the appearance of wanting choice when they merely desire a customized experience. This concept requires an understanding of how people make decisions in general. To achieve this, the information-gathering process, first introduced by John Dewey in 1910, will be used as a guideline. It is as follows:

1. Problem / Need Recognition
2. Information Search
3. Evaluation of Alternatives
4. Purchase Decision
5. Post Purchase Behavior

For the purpose of this piece, the focus will be on steps two and three, information search and evaluation of alternatives, and how those influence step four, the purchase decision. An assumption will be made that the problem and need recognition have already been initialized by the consumer.

How do consumers get the information they need to make a purchasing decision?

According to Ad Age's annual advertising report, the top two hundred advertisers in the U.S. spent \$163 billion in 2018 on advertising, a 3.6 percent increase from the year prior. With this much money being spent on branded advertising, one would easily assume its profound impact on a customer purchasing decision. This, however, is a misinterpretation of the relative impact that advertising brings. Only twenty-one percent of consumers believe that branded advertising and communications are more trustworthy than YouTube reviews. Moreover, only thirty-one percent say that generic customer reviews are more trustworthy than social media influencers ("The Loyalty Divide," 2018). Although branded advertising is a controllable communication, it is not always viewed as positively as one may assume. What does this mean for advertising?

Consumers are increasing their attention to micro-influencers and, due to their smaller audience, feel as though the message being conveyed is more individualized. Impressionable minds wish to emulate the behavior and lifestyle portrayed and the limited scope they provide leads to increased perceived individuality. Consumers are overwhelmingly straying away from traditional media forms and towards these more tailored experiences.

Alongside this is the belief that companies should offer a lifestyle, not just a product. Especially if a company attempts to sell product based off of their brand, they need to ensure that the brand they are selling is a brand that customers align with. Despite brand loyalty declining in recent years, eighty-nine percent of shoppers say that they stay more loyal to a company that "share their values." Furthermore, ninety-four percent of brands show more loyalty to companies with increased transparency ("The Loyalty Divide," 2018). More than just tailored advertising experiences, customers demand to feel as though the company is trustworthy and "moral." Customers demand a brand to be more than a label on their package.

What does this have to do with offering less SKUs? In general, customers are straying away from companies that offer a plethora of options and more towards companies that offer the appearance of a tailored experience. If a customer considers a company when making a purchasing decision, it is in the context of relatability to the customer rather than the sheer choices or pricing options they offer. Now that the concept of information-gathering has been considered, this thesis will now examine the difference between objective and subjective decision-making, and which is more common in the retail space.

Objective verses Subjective

Upon understanding how a decision is theoretically made, this thesis will cover the objectivity verses subjectivity of a purchasing decision. In most major surveys, customers note that they see themselves as being objective shoppers: examine the product cost, calculate the relative value, and choose which product offers the best “mathematical” outcome. In a theoretical world, this objective method would lead to the best purchasing decisions and would therefore be the most commonly practiced process. Due to a large variety of factors, many of which this thesis will soon discuss, this is rarely the manner in which purchases are decided upon and made by the modern customer.

How familiar is the customer with the product category? How full or empty is the shelf that the product sits on? Did the customer have a bad day at work? Is there something distracting the customer from realizing the full value of your product? All of these considerations, many of which are not often considered by the retailer, directly impact the way in which a customer views a store, views a product, and, in the end, spends their money.

On average, consumers spend just twenty-seven seconds per purchase decision (“Gen Z,” 2013). In these few seconds, retailers must convince their potential customer that they are the best choice and what variant to purchase. The more variants offered, the less time that is able to be spent on each individual iteration and, therefore, less time to convince the consumer which product to purchase. Is it any wonder that ninety percent of consumers are more likely to buy a product simply for having a peel-off savings coupon on it? (“Customer Survey,” 2018)

All of these ideas cultivate in the purchasing decision being subjective, purchasing based on preconceived notions, beliefs, and situational factors. Although seemingly bad, this is due to the confusion that many consumers face when making a purchasing decision. The tailored shopping experience, where choices are seemingly predetermined, relies heavily on an understanding of who the target customer is. Although obtaining this information has received some backlash in recent years, customers overwhelmingly appreciate and value the convenience it brings. Although eighty-one percent of consumers say they would “consider removing their personal information if they could,” eighty-five percent of consumers believe that a personalized experience based on personal information is appealing (“The Loyalty Divide,” 2018). Consumers overwhelmingly like the consequence of this situation but fear the inability to control it. By offering a positive customer experience, both the business and the end consumer can benefit from this transaction.

This thesis will overview the implications, and benefits, that this may bring. In Chapter 4, this thesis will examine the business case for supply chain optimization through the use of build-to-stock (BTS) rather than build-to-order (BTO) in order to increase the use of automation and, subsequently, reduce raw material safety stock. Following this, Chapter 5 will use all of the discussed information and relate it to real-world business practices.

Chapter 4

Supply Chain Optimization Overview

When considering cost reduction within a company, supply chain optimization is often the first place management will consider. Following an audit of over one-thousand corporations across a variety of fields, an independent researcher found that the cost of an average supply chain equaled 9.8 percent of sales whereas market leaders, the top ten percent of performers, cost only 5.7 percent. This delta between the average and best supply chain performers, per category, was over fifty percent (“Reducing,” 2016). This study proved two things that many firms probably already assumed: maintaining a supply chain was expensive and the disconnect between the average and market leaders is huge.

The largest reason why there is such a large disconnect between these companies is simple to label yet extremely difficult to quantify: uncertainty. Ideally, a corporation would produce exactly what the customer wanted, with neither wasted nor held inventory until the customer wants it. The sheer uncertainty of human nature leads to the aforementioned uncertainty and, subsequently, the issue of holding too little or too much inventory. Depending on the product category, or number of product variations offered, this can have profound impacts to a company’s liquidity and profitability.

Although an asset on balance sheets, inventory requires a high cash investment to obtain. Furthermore, once the product is acquired, storing the product results in holding costs in addition to the risk of obsolescence, damage, and more. For this reason, a measure of company efficiency is often their inventory turnover ratio. This can be calculated by finding cost of goods sold (COGS) and dividing this by average inventory. The higher this ratio, the “leaner” a process is,

for it requires less inventory to remain on-hand but not in-use. Differences in forecasting predictions, coupled with uncertainty and minimum service level requirements, lead to the need for extra stock, or safety stock, to be held. Safety stock will be covered in greater detail in the next section.

Safety Stock

Safety stock has become an essential part of operating a physical-good manufacturer or retailer. With the increased demand for goods, coupled with decreased acceptable lead times, as discussed earlier in this thesis, it has become essential for companies to carry as much as is financially feasible. In addition to allowing raw and finished goods to be held on-site, safety stock has a plethora of benefits associated with it. These include increased response time to unanticipated demand spikes, additional time to response to sourcing issues, and the ability to combat damaged or lost inventory.

Although a company would like to produce exactly the amount their customers want, this is nearly impossible. For this reason, safety stock is produced. The simplest way to find this is by finding the average daily usage times the average lead time (in days) and subtracting it from the maximum daily usage times the maximum lead time (in days). This equation, though simple, will allow a company to generally predict the needed flexibility they must have, per SKU, in order to achieve a predetermined service level (King, 2011).

The above equation, though accurate for generalization, is exactly that: a generalization. There are few ways to accurately estimate safety stock, and therefore many companies find themselves ordering more or less than they actually need. Often, they opt to order too much, as

the cost of lost sales is perceived as higher than the cost of overstocking, regardless of the actuality of this statement in the business.

It is estimated that retailers lose \$1.75 trillion per year on over- and understocking product. It is then, without question, that management turns to this sector to reduce costs. From 2012 to 2015, lost sales due to stockouts increased by thirty-nine percent and overstocking increased by thirty percent. Moreover, preventable returns accounted for \$642.6 billion in lost sales in 2015 alone, in part due to the increase in online retail (“Retailers Lose,” 2015).

Despite carrying all of these benefits, companies strive to reduce the amount of inventory carried, as well. Despite having “value,” this lost liquidity only worsens when coupled with the risk of obsolescence, damage, or even theft.

Automation

When looking at the manufacturing process in a modern supply chain, it becomes clear that competitive advantages are moving away from incremental increases in human capital efficiency and towards full process automation. New advances such as the Autonomous Mobile Robots (AMR), which can automatically pick products in a warehouse and transport them to the distribution line, reduce costs to a level previously unattainable in this industry. The question is no longer “if” a manufacturing facility should implement technology to automate their process but, rather, “how.”

In many instances, this is a small structural shift, for companies that have previously used repetitive human labor, such as a production lines or item picking, have found that robotics allows for equal or better output with drastically less input. Some companies, however, never considered the potential of this change in methodology and are now facing relatively higher costs

and struggle to remain competitive. Later in this thesis, one such company, Dell, will be examined through this lens and specific automation recommendations will be made. For the purpose of this section, however, automation will be viewed from a general manufacturing sense.

For the purpose of this thesis, the exact manner in which automation should be implemented will not be covered in depth in this section. Although some examples will be provided, automation implementation strategies and outcomes vary greatly on the country, industry, and even specific company. Rather, this section will serve to provide a brief business-case for automation. When Dell and the automotive industry are covered later in this piece, more specifics will be provided.

One of the largest benefits associated with automation is workplace safety. The two most common ways in which automation can help in this capacity is through prefabrication or by having robots completing the job by themselves. For example, over eighty percent of housing in Japan have shifted to prefabricated units produced in factory environments. Through the use of automation in the factory and primarily heavy machinery in the field, companies such as Misawa Homes and National House have been able to maintain high quality control, lower manufacturing costs, and low, industry-leading workplace injuries previously caused by the reliance of human labor at the housing worksite (Miller, 2019).

Another benefit realized by companies that have implemented widespread automation is reduced labor hours and costs. These benefits are what lead to the financial incentives that many think of when viewing automation. According to the Boston Consulting Group, increased automation is anticipated to cut labor costs by twenty-two percent in the U.S. alone from 2015 to 2025. When increased productivity and efficiency are considered, proper implementation of

automation leads to an average cost savings of forty to seventy-five percent, with payback periods ranging from a few years to just a few months (Kirk, 2018).

Automation, despite its apparently massive benefits, has not seen the widespread implementation that some anticipated it would receive. Although immediate issues, such as large capital expenses and worker displacement, have been partially to blame, a larger, much more difficult issue, must not be overlooked: the way in which products are offered. More specifically, the amount of product variation and end choices offered to the customer and, based off of this, if a build-to-order (BTO) or build-to-stock (BTS) methodology should be applied. Although a combination of both is often the end result, only the former can realize the full benefits that automation brings, as this thesis will examine in the next section.

BTO verses BTS

As mentioned in the previous section, a huge barrier to implementing automation, even minor variations of it, is the manner in which goods are produced, marketed, and sold. In most scenarios, build-to-stock (BTS), rather than build-to-order (BTO), is needed to realize all of the benefits that automation brings.

Most worthwhile in manufacturing with similar raw materials across multiple products, BTO allows a company to only stock a product when an order is placed or, at the very least, highly anticipated. Although limiting the amount of finished goods stock on-hand, the increased variety leads to exponential increases in raw material inventory on-hand, making it nearly impossible for most companies to implement in an efficient manner. When the benefit of offering customers this level of customization is weighed against the cost of carrying it out, many companies choose BTS instead.

BTS, which increases inventory holding cost and the potential of obsolescence can theoretically lead to a reduction in stockouts and subsequent decreased service levels by decreasing manufacturing time. While good in theory, this strategy begins to falter when a wide array of SKUs is offered. Compared to a company that predominately uses BTO methodology, such as Dell, that can stock raw material and build customization, BTS cannot; it requires stock to be held for each good individually. BTS does, however, have the benefit of increased manufacturing efficiencies.

Given these variables, which is the best option?

In many cases, it depends. For highly customizable and user-driven goods, BTO is the most logical solution. Dell, with a strong business and enthusiast driven market, relies on this to stand out from its competitors. Many companies, however, attempt to reap the benefits of both methods while, unknown to them, absorb the consequence of both as well. Soon, they find themselves stocking large quantities of product variants, leading to high holding costs and supply chain inefficiencies, while failing to offer their customers the product(s) they actually desire.

In Chapter 5, this thesis will use Dell Technologies Incorporated and the automotive industry as case analyses of industries that utilize both BTO and BTS methodology. By doing so, the thesis will use the ways in which customers decide, covered earlier in this section, to prove that providing less choice, preferencing BTS over BTO, and general automation will lead to lower costs and increased sales.

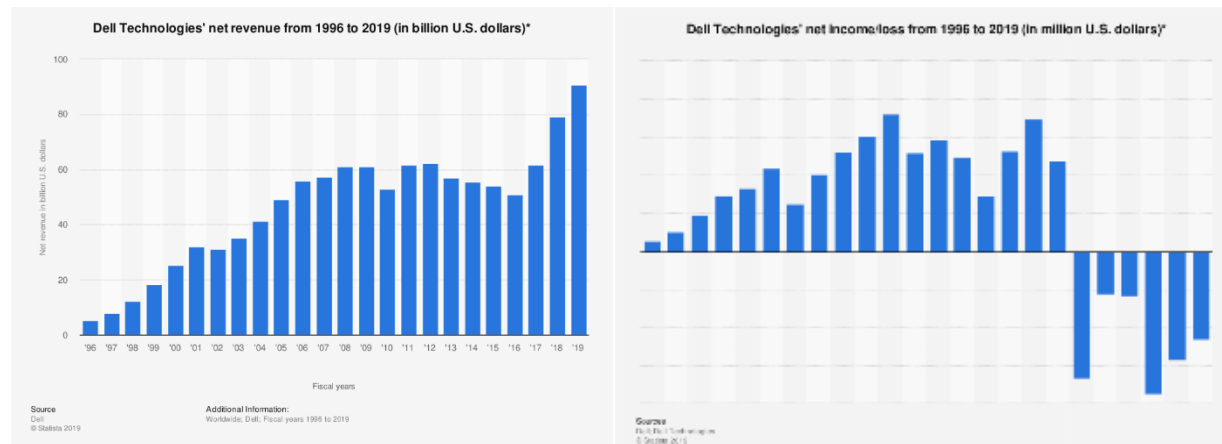
Chapter 5

Company Analysis - Dell Technologies Incorporated

Following the analysis of customer behavior, purchasing methodology, and supply chain optimization strategies, this thesis will now use Dell Incorporated and the automotive industry as real-world examples of how to improve processes and work towards automation by limiting product offerings. By examining these companies, this thesis will prove the plausibility of real-world implementation in a manner that can theoretically be transferred to other businesses and product fields. This includes specific automation implementation strategies.

Founded in 1984, Dell originated as a small computer manufacturer known for building IBM PC-compatible computers from stock components. By using these standard components, Dell was able to offer their customer perceivably limitless customization and personalization compared to their competitors. Dell grossed over \$73 million in revenue in their first year alone and, as seen in Figure 1, saw increased profitability through the early 2000s. Keeping overhead costs between one-half to one-fourth their competitions' as a percentage of overall revenue, they were able to grow into the world's largest PC manufacturer by 2000 ("Dell Inc,," 2019).

Figure 1. Dell Net Revenue Verses Net Income



Sales began to falter in the early 2000's, however, due to a combination of the "Dotcom Bubble" burst and a lack of price competitiveness against the much more efficient Asian manufacturing processes offered by companies such as Compaq and Hewlett-Packard. Although their portfolio has since become more diversified, including investments in networking, security software, and cloud computing, they were removed from the NASDAQ stock exchange in 2013 after a twenty-four billion dollar leveraged buyout made them a private firm ("Dell Inc," 2019).

Despite recent sales increases, specifically in networking and PC computers, Dell is currently maintaining a mere seventeen percent market share, in sharp contrast to Lenovo and Hewlett-Packard, at twenty-five and twenty-three percent, respectfully. This market capitalization is in addition to the decline of the PC market as a whole, which has seen annual sale losses since its peak of 360 million units shipped in 2011 ("Global PC Sales," 2020). Today, Dell relies mainly on cloud computing and storage options for their overall profitability.

Although the reasons for this decline vary company to company, one of the largest systematic reasons was shortages in central processing units (CPUs) and random-access memory modules (RAM). These shortages, fueled by material shortages at companies such as Intel, forced companies like Dell to absorb these costs and find alternate suppliers. This, in part, has led to the increased market competition by companies like AMD and Qualcomm, especially in the commercial space.

Throughout this period, Dell has relied on BTO as being their core competency and distinguishing factor. Although their use of BTS has increased in recent years, especially given their wholesale partnerships with major retailers, such as Wal-Mart, BTO is still a huge driver of their success. Given the plethora of benefits that automation has, what can Dell do to reap the marketing benefits of BTO while expanding the manufacturing benefits of BTS? In this next

section, this thesis will examine the automotive industry and how they have been able to give the perception of BTO while maintaining BTS.

The Automotive Industry

In order to properly realize the potential that this could bring, this thesis will compare it to another industry that uses both BTO and BTS methodology to maximize customer satisfaction: automotive. This industry, which is known universally for their innovative and efficient automation techniques, provides insight on ways to internalize the benefits of BTS while maintaining the seemingly unique product offering of BTO.

Such as with the Head & Shoulders shampoo brand, mentioned earlier in this thesis, strategic marketing and a strong knowledge of their target customer has allowed multiple companies in the automotive industry to offer customer-specific products while maintaining their automated, assembly line production process. One keyway many automotive manufacturers are able to accomplish this is by portraying different car categories and models as being designed for different customer bases entirely. Especially when making a large purchase, such as with a new car or computer, two considerations are internally made by the customer: hedonic and utilitarian. As described in “Delight by Design,” hedonic focuses on promotion goals, such as confidence and excitement, whereas utilitarian focuses on prevention, such as safety and security (“Marketing Cars,” 2011).

The combination of hedonic and utilitarian considerations, both in the actual makeup of the product as well as the marketing of it, allow the automotive industry to make products appeal to uniquely different customers. Upon learning what customers desire in design and function, car manufacturers are able to develop models, options, colors, and even names to appeal to these

customers specifically. Sellers, who are often privately owned and strive to appeal to their regional client base, are then able to purchase based on their customers, leading to the varied selection that many find at their local car lot.

First is the manner in which different car variants are marketed towards different customer segments. Minivans, for example, are marketed towards families with multiple young children due to their ability to leverage their relatively large utilitarian consideration. SUVs seek to combine both utilitarian and hedonic and appeal to young adults and few children, offering similar “family” seating capacity with marginally less perceived safety. Sedans are marketed mainly to young adults and professionals, given their relatively lower cost, increased fuel efficiency, and modern designs.

This hedonic and utilitarian combination can be expanded to car companies as a whole, allowing some brands to focus on different customers entirely. Mazda, with their slogan, “What Do You Drive?” appeals to young adults who value the hedonic above utilitarian. The social status and performance associated with the car is above all else. As a result, Mazda discontinued their minivan line in 2009 to focus on their core market: sport SUVs and sedans. Subaru, on the other hand, appeals mainly to parents of teenagers with their “Baby Driver” campaign and slogan, “Love. It’s What Makes a Subaru a Subaru” (Gazdik, 2019).

By marketing different car categories to different customers, the customization options within them are able to be immensely limited. This has allowed a majority of manufacturers in the automotive industry to use BTS rather than BTO manufacturing methodology. Toyota’s Camry line, although seemingly offering a multitude of customization options, is designed to appeal to very different customers without drastically increasing customization options. The “L” and “SE” models, or “Entry-Level” and “Sport Edition,” respectively, appeal to a marginally

younger client base whereas “LE,” or “Luxury Edition,” appeals to a marginally older customer (“Toyota Acronyms,” 2020). The base car design and components, however, are made from standard materials, allowing these slight variations in design to distinguish each model in the eyes of the consumer. This distinction allows car manufacturers, such as Toyota, to more easily predict who will purchase which car and plan manufacturing capacity accordingly.

By doing all of this, the automotive industry has been able to massively increase the amount of automation used in their manufacturing facilities. Europe’s second-largest car manufacturer, owning brands such as Citroën, Vauxhall and Opel, recently announced that it would be “increasing factory performance and reducing production costs” through the implementation of Universal Robots (UR). These robots, which drastically improve worker ergonomics, have resulted in a ten percent improvement in geometric dimensioning and tolerance (GD&T), has had no failures in its first year of 200,000 cars produced, and has saved the company two to eight Euros per car, or 1.6 million Euros annually (McCall, 2018).

Seemingly only applicable to the automotive industry, the example above proves that understanding the customer base and providing a product that fulfills their unique need can remove uncertainty in demand while maintaining customer satisfaction. This allows the manufacturer and retailer to decrease choice while maintaining the perception of choice. On the business side, this technique requires massive amounts of customer information and understanding but, when done properly, can lead to improved automation and the potential for large savings. In the next section of this thesis, Dell Technologies will be reexamined, and considerations will be made on how they can learn from this industry and begin implementing automation without limiting the perception of choice.

Dell: Offering Choice through BTS

When looking at Dell Technologies, the reasoning behind their reliance on BTO is clear: the ability to offer a product that fulfills a customer's precise need. The method used to achieve this goal, however, has led them to remain uncompetitive in terms of both price and lead time without offering competitively more benefits than their competitors. In this portion of the thesis, the ways in which choices can be offered to the customer while maintaining the benefits of automation and efficiency will be discussed. Although done in a theoretical manner, the strategies described can be transferred into other companies and industries with slight adaptation.

A majority of Dell's supply chain inefficiencies are believed to originate in their final goods warehouse operations. This is based on a visitation to one of their largest distribution facilities, located in Harrisburg, Pennsylvania. In order to increase efficiency in these facilities, increased automation, both through a human capital reduction and increased efficiency, should be used. Before looking to implement such automation strategies in these facilities, however, one must first examine the reason why the facilities are inefficient to begin with.

First, this thesis will go into greater depth on the current consumer-grade consumer laptop market. This includes the decreased lifespan of computers, specifically laptops, and the relative overabundance of selection through Dell. Then, it will examine possible methods of mitigating these inefficiencies.

A multitude of reasons have resulted in the average lifespan of a laptop only being three to five years, such as quickening advances in computing capability, increasing computing requirements (i.e./ graphics in gaming), design changes (i.e./ chassis), and batteries no longer holding a charge (LaMarco, 2018). Dell's BTO mentality worked well when desktop PCs, with

their modular designs, were the norm, allowing for components such as the CPU or GPU to be replaced independently. This is not the case for laptops, however, as most components are built for specific chassis, often being soldered to the motherboard itself. This means that, often, if the consumer's needs change, the entire laptop needs to change, removing the need or desire for fully customizable, high-cost machines.

Consumers recognize this and, as a result, often do not purchase these highly customized, performance laptops unless they are in the enthusiast market. Why would one spend thousands on something they will replace in three years when a much cheaper model will still get the job done? Currently, Dell offers 136 different consumer-grade laptop models through eight model categories. Within each of these models, the customer is given the option to change their CPU, GPU, RAM, color, and more, leading to exponentially more combinations ("Laptops," 2020). Compare this to a company like Apple, who carries just seven laptop consumer-grade laptop models in two laptop categories ("Mac," 2020).

Before automation techniques can be considered, Dell, and companies in similar situations, should work towards limiting the amount of choices they offer their consumer-based market. For the purposes of this thesis, the business-to-business market will be excluded. Based on the category descriptions, Dell is attempting to appeal to four basic consumer demographics: students, everyday users, content creators, and gamers. By limiting choices to just these four categories, rather than the eight that they currently offer, they are quickly able to decrease their product offering in half while still offering more selection than their competitors and giving the perception of much more selectivity.

Upon decreasing the amount of choice and customization offered to the end user, effective implementation of efficient practices in warehousing and manufacturing, perhaps even

full automation, become more plausible. In addition to simplifying the overall supply chain, as mentioned previously, such implementation can lead to annualized savings of forty to seventy percent (Kirk, 2018). Although specific practices may start simple, with improved labeling and storage practices, increased automation, such as with robotics in picking and AutoStore, will allow a company such as Dell to recognize the full potential of their change.

Although the automation strategies described above are recommendations specific to Dell Technologies, the potential implications of similar strategies can be profound when introduced in other industries and companies. The manner in which they were introduced, however, is the most important aspect. Without limiting the amount of choices offered to their customer, removing as much as half of their current offerings and product lines, Dell would be unable to implement the suggestions above without massive expansion of their infrastructure.

Strategic removal of choice, ensuring that the customer still feels as though they are choosing the product, ensures that this cost-reducing strategy does not impede on customer satisfaction or retention. The savings incurred, whether they are passed onto the customer or not, will subsequently lead to a leaner and more efficient supply chain system, keeping assets fluid and potential growth and investment opportunities viable.

Chapter 6

Conclusion

The current consumer market is, without question, changing. The drastic shift in consumer preferences from traditional brick-and-mortar to a largely internet-based economy has led many to fear the vitality of our economy. Perceiving choice and selection as the largest driver for this shift, many companies have been pushing more selection onto the customer with the hopes that market saturation will lead to increased market share. Few have stopped to question, however, whether customers value this increase in choice.

This thesis sought to prove the following: customers value the perception of choice and obtaining a product that resolves an individualized need, not the array of choices provided. By analyzing companies who have effectively reduced choice but increased sales, such as Wal-Mart and P&G, this thesis has proven proof of concept. In the company analysis portion, this thesis analyzed two industries that utilize both BTO and BTS in order to fulfill customer demand: the computer industry, such as Dell Technologies, and the automotive industry.

By limiting the choices offered by these companies, the opportunity for simplified supply chain systems, including more efficient in-house practices and automation, is drastically increased. In order for companies to capitalize on the supply chain efficiency gains that recent innovations, such as automation, bring, companies must first simplify their supply chain. Offering only the products customers value seeing, ensuring the perception of choice is maintained, the potential for profitability increases are profound.

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ACADEMIC VITA
RYAN C. DINCHER

EDUCATION

The Pennsylvania State University: Schreyer Honors College **University Park, PA**
B.S. in Supply Chain and Information Systems with Sustainability Leadership Minor May 2020
Dean's List 8 of 8 semesters GPA: **available upon request**

RELEVANT WORK EXPERIENCE

Penn State Housing Department **University Park, PA**
Senior Program Coordinator May 2019 – May 2020

- Led a team of 70 student employees and manage \$100K program budget
- Oversaw weekly general meetings, facilitating effective outreach and leadership development

Assistant Program Coordinator May 2018 – May 2019
EcoRep Building Advisor August 2016 – May 2018

The TJX Companies, Inc. **Boston, MA**
Merchandising Intern May 2019 – August 2019

- Analyzed weekly sales reports to develop merchandise strategies and allocate product
- Communicated and resolve merchandise issues with distribution centers and buyers

Follett LLC (Middleby Corporation) **Easton, PA**
Materials Intern May 2018 – August 2018, December 2018

- Assisted in the implementation of cost-driven initiatives, resulting in over \$1 million savings
- Reacted to varied sourcing conditions, such as late shipments, supplier bankruptcies, and tariffs

LEADERSHIP EXPERIENCE

Penn State Academic Affairs **University Park, PA**
Supply Chain Teaching Assistant Spring 2020
Sustainability Education Teaching Assistant Spring 2018, Spring 2019, Spring 2020
Macroeconomics Teaching Assistant Fall 2017, Spring 2018, Fall 2018

Alpha Kappa Lambda Fraternity **State College, PA**
Executive Vice President January 2018 – May 2020

- Enforced “Good Standing” accreditation requirements, including GPA and community service
- Resolved interpersonal conflicts to ensure participation of all Executive Council members

Lion Ambassadors **University Park, PA**
Member January 2019 – May 2020

- Communicated Penn State’s history, personality, and traditions to students, alumni, and visitors
- Facilitated active community involvement through on-campus tours and programming

Penn State Beaver Stadium **University Park, PA**
Director of Zero Waste Volunteers August 2018 – December 2018

- Managed a team of 16 volunteers’ signups, security accreditation, and game-day operations

SKILLS/AWARDS/PHILANTHROPY

Honor Societies: National Honor Society (Phi Eta Sigma), National Leadership Society (Sigma Alpha Pi)
Boy Scouts of America: Eagle Scout, Order of the Arrow Leadership Association