

# Study of Supply Chain Optimization and Sustainability of Apple

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## ABSTRACT

This study delved into the perceptions surrounding Apple's supply chain optimization efforts and the impact they have on consumer behaviour. By examining whether people believe iPhones become cheaper after being made in India and how this affects their decision to use Apple products, researchers uncovered valuable insights into consumer preferences and the role of sustainability in purchasing decisions.

The findings revealed a strong link between the perception of iPhones becoming cheaper after production in India and the likelihood of consumers using Apple phones. Those who strongly believed in this cost reduction tended to be more inclined to use Apple products compared to those who were less convinced. This suggests that consumers are influenced by the perceived affordability of Apple devices, which in turn affects their brand loyalty and purchasing behaviour.

While the study also explored perceptions of Apple's supply chain optimization efforts, the direct impact on consumer behaviour was not as clear. Further investigation is needed to fully understand how consumers perceive Apple's efforts to streamline its supply chain and ensure product availability and timely delivery.

One notable finding was the positive impact of Apple's sustainability efforts on consumer behaviour. Consumers who perceived Apple as being committed to sustainability were more likely to view the brand favourably, demonstrating the increasing importance of environmental consciousness in purchasing decisions.

However, it's important to acknowledge the limitations of the study. The focus was on consumer perceptions rather than actual behaviour, which may not fully capture the nuances of consumer decision-making. Additionally, the sample size and demographics of the participants were not provided, raising questions about the generalizability of the findings.

Moving forward, future research could delve deeper into the relationship between consumer perceptions and actual behaviour, taking into account factors such as product features, pricing strategies, and competition. By understanding the underlying drivers of consumer decision-making, companies like Apple can tailor their marketing strategies to better meet consumer preferences and drive business success. In conclusion, this study sheds light on the complex interplay between consumer perceptions, supply chain optimization efforts, and sustainability initiatives in shaping purchasing decisions. By aligning corporate strategies with consumer preferences, companies can not only drive financial performance but also contribute to environmental sustainability and social responsibility.

## Chapter 1: Introduction

The commencement of this research beckons us to undertake a thorough and extensive investigation into the multifaceted realm of Apple Inc., an unquestionable technological powerhouse that has not only

influenced but transformed the continually evolving technology landscape. Our aim is to surpass mere recognition of Apple's prominence and explore the intricate depths of its trajectory, development, significant milestones, and the profound influence it has undoubtedly exerted on worldwide innovation. This sweeping overview not only acts as an introduction but also serves as an entry point into the deeper narrative unfolding within the intricate layers of this study.

**Apple's Evolution and Pioneering Spirit:**

Understanding the profound impact of Apple on the technology sector necessitates tracing its evolutionary path. Apple's journey transcends mere corporate history; it embodies a narrative interwoven with innovation, resilience, and an unwavering quest for perfection. Originating in a humble garage and ascending to global dominance, Apple's trajectory epitomizes the essence of entrepreneurialism. Groundbreaking creations like the Macintosh, iPod, iPhone, and iPad have not only influenced consumer habits but have also redefined entire industries, cementing Apple's position as an enduring force for revolutionary advancement.

**Milestones:**

Apple's journey is characterized by pivotal milestones, each signifying a significant shift in the technological paradigm. The introduction of the graphical user interface with the Macintosh in 1984 marked a groundbreaking moment, revolutionizing user interaction with computers. The resurgence of Apple under the leadership of Steve Jobs in the late 1990s rejuvenated the company and set the stage for future innovation. The game-changing launch of the iPhone in 2007 redefined the smartphone industry, setting new standards for functionality and design. Subsequent introductions of groundbreaking products further underscored Apple's position as an innovator and trendsetter in the technology sphere. Each milestone adds to the overarching narrative of how Apple has consistently disrupted and elevated the technological landscape.



**Global Innovation Impact:**

Apple's influence transcends corporate triumphs, profoundly impacting global innovation. The company's unwavering focus on design aesthetics, user experience, and seamless integration has established industry benchmarks. The revolutionary App Store ecosystem, for example, has not only empowered developers

but has also spawned an entire economic ecosystem. Apple's impact extends beyond its product offerings; it has fundamentally reshaped perceptions of technology, consumption patterns, and integration into daily life. This cultural shift towards innovation, catalyzed by Apple, extends far beyond its headquarters in Cupertino, resonating across the globe.

### **Setting the Stage for Deeper Exploration:**

As we embark on this research journey, the panoramic view of Apple's evolution serves not merely as a historical backdrop but as a foundational context. It underscores the pivotal role Apple plays in shaping the trajectory of the technology sector, paving the way for a deeper exploration into the intricacies of its supply chain management. This introduction lays the groundwork for understanding how Apple's strategic decisions, operational efficiency, and dedication to sustainability are inherently intertwined with its formidable presence in the global technology landscape. Within the intricate fabric of contemporary business success, this introduction strategically highlights the often underestimated significance of supply chain management—a silent orchestrator behind the scenes, weaving together the seamless operations. This recognition serves as a precursor to the dual focal points that define the comprehensive scope of our study: optimization and sustainability. The deliberate delineation of these areas establishes a framework for a meticulous examination of the dynamic interplay between Apple's operational excellence and its unwavering commitment to environmental and social responsibility.

### **Chapter 2: Literature Review**

This comprehensive literature review navigates through a diverse array of studies, articles, and scholarly works, interconnecting the domains of supply chain management, optimization, and sustainability. With a keen emphasis on Apple Inc. as a prime case study, our aim is not merely to survey existing knowledge but to meticulously dissect the theoretical underpinnings that shape our research endeavours.

In this literature review by Marco Li and Yuxuan Sun DATED 21st March 2020, with equal contributions, supplemented by insights from Parth Singh, the intricate realm of supply chain management (SCM) is explored. It delves into foundational theories, optimization models, sustainability paradigms, and traces Apple Inc.'s supply chain evolution. Through comparative analysis with industry benchmarks, the authors identify gaps in literature, laying the groundwork for future research. This comprehensive review not only consolidates existing knowledge but also provides a nuanced understanding of Apple's supply chain dynamics within the broader SCM landscape.

An overview of apple supply chain, Aliyah terry, December 2022

In the exploration of optimization theories and models, such as the Bullwhip Effect and Optimization Game Theory, strategic insights emerge, aimed at bolstering efficiency and curbing costs. A spotlight is cast on the shift towards sustainability within supply chains, as examined through lenses like Corporate Social Responsibility and the Triple Bottom Line, particularly in Apple's dedication to environmental preservation, ethical procurement, and community involvement. Through a historical analysis of Apple's supply chain evolution, pivotal transitions like the move to an outsourced model with Foxconn come to fore. Authors undertake a comparative examination, juxtaposing Apple's practices against industry benchmarks like the SCOR model. In identifying gaps within existing literature, they position their study as a pioneering venture into nuanced challenges and prospects, particularly within Apple's sustainability endeavors. This review not only consolidates existing knowledge but also lays the groundwork for future

inquiry, intertwining theoretical constructs, historical insights, and industry standards to enrich comprehension of Apple's supply chain dynamics.

Apple supply chain-The best supply chain in the world, quick book, April 2020

In 2011, a comparative analysis of inventory management among tech giants revealed Apple's remarkable performance compared to Dell, HP, Blackberry (RIM), and Motorola. Utilizing the Inventory Turnover formula, which signifies how many times a company's inventory can be sold and replenished within a specified period (with higher numbers indicating better performance), Apple surpassed its competitors significantly. Specifically, in 2011, Apple outperformed Dell by a factor of 2, HP by a factor of 5, Blackberry by a factor of 4.5, and Motorola by a factor of 5.5. Apple's annual inventory reached its zenith in 2017, peaking at a value of \$4.8 billion. However, in 2018, the company experienced an 18.52% decline year-over-year. Yet, Apple swiftly rebounded, as evidenced by their inventory totaling \$3.8 billion in 2019, marking a 3.79% increase compared to 2018.

Farzaneh Mahmoudi, Alireza Eshghi, Mohadese Basirati(B), and Erfan Hassannayebi's research, published in September 2023, focuses on the intricate world of inventory management within supply chain networks. Picture a three-tiered system involving manufacturers, distribution centers, and retailers. By utilizing a combination of agent-based simulation and MCDM (Multi-Criteria Decision Making) methods, they aim to evaluate and refine inventory policies. In simpler terms, they're using computer simulations and smart decision-making techniques to figure out the best ways to handle inventory, ultimately aiming for smoother supply chain operations and cost savings.

Hongzhou Sun's 2023 paper takes a deep dive into Apple's renowned supply chain management. Yes, the tech giant isn't just known for its sleek devices but also for its behind-the-scenes logistics prowess. Sun's study highlights Apple's strengths in this area but also acknowledges ongoing challenges. Essentially, it's like peeking into Apple's playbook to see how they do things and learning valuable lessons for other companies looking to up their supply chain game in a competitive market.

Chen Xing's 2023 research, which zeroes in on sustainability. Apple's not just about making profits; they're also striving to be environmentally and socially responsible. Xing identifies leadership, supplier management, resource usage, transparency, and social responsibility as key factors in Apple's sustainability efforts. However, there's still work to be done, particularly in areas like pollution and labor rights. Think of it as a roadmap for companies aiming to balance profits with planet and people-friendly practices.

let's talk innovation. Harshal Padwal's June 2023 invention introduces a clever system for optimizing supply chain management in the e-commerce sector. Imagine bees buzzing around, each with a role to play in their hive. Padwal's system mimics this collective intelligence using Bee Swarm Optimization (BSO) algorithms. By harnessing this natural phenomenon, e-commerce companies can improve logistics, routing, and inventory management, ultimately saving costs and boosting efficiency. It's like having a digital swarm of bees working tirelessly to make sure your packages get to you faster and cheaper.

we have F P Putri and I Yuliasih's 2021 study focusing on supply chain management in the agricultural industry. While it may seem like a different world from tech gadgets, the principles remain the same. Efficiency and optimization are key. Their system, like Padwal's, employs optimization algorithms to streamline operations and cut costs. Whether it's iPhones or apples, the goal is to get products from farm to table—or from factory to doorstep—as efficiently as possible.

Dr. Coenrad Adolph Groenewald and team's March 2024 paper dives into the realm of Artificial Intelligence (AI) and its transformative role in supply chain management. AI isn't just a buzzword; it's

revolutionizing the way companies handle logistics. Picture machines learning from vast amounts of data to predict demand, manage inventory, and mitigate risks. It's like having a super-smart assistant who can foresee problems before they happen and find solutions in real-time. But of course, there are challenges, like ensuring data quality and ethical considerations. Still, the potential for AI to drive operational excellence and adaptability in today's fast-paced business world is undeniable.

### **CHAPTER 3: RESEARCH METHODOLOGY**

The research methodology section serves as the compass guiding the course of our study, outlining the meticulous methods chosen for data collection and analysis. In this chapter, we delve into the intricacies of our approach, laying bare the considerations that have shaped our decisions and the rationale behind our chosen path.

#### **Choosing Between Primary and Secondary Research:**

The initial step in our research methodology involves a thoughtful consideration of whether primary or secondary research is more apt for our study. Primary research involves the direct collection of data, such as surveys, interviews, or observations, while secondary research relies on existing sources, including literature, databases, and archival records. Given the breadth of our study encompassing supply chain management, optimization, and sustainability within Apple Inc., a hybrid approach is deemed most suitable.

Statistical software like SPSS and Excel will be used for quantitative analysis which will involve different variables.

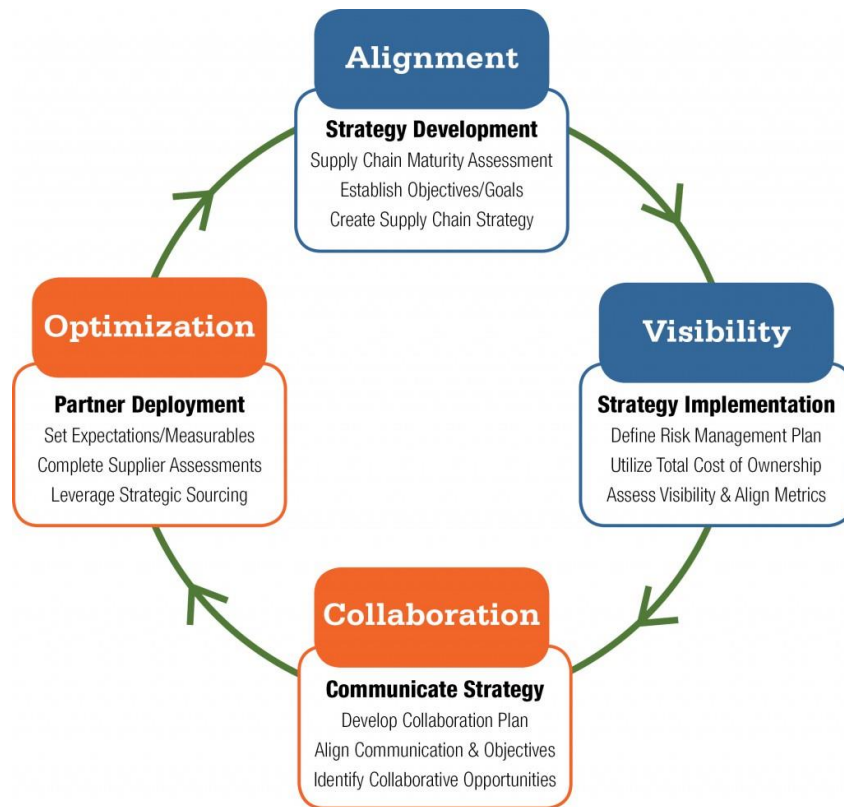
#### **Objectives:**

- To determine whether primary or secondary research is more suitable for the study.
- To specify the sources and databases consulted in case of secondary research.
- To detail the survey design, sample size, and questionnaire structure for primary research.
- To justify the chosen statistical tools or tests for data analysis.

### **CHAPTER 4: DATA ANALYSIS AND INTERPRETATION**

In the intricate dance of data analysis and interpretation, this chapter stands as the crucible where the raw numbers and empirical evidence transform into meaningful insights, revealing the intricate layers of Apple Inc.'s supply chain optimization and sustainability practices. Through a judicious application of a diverse array of statistical tools, we embark on an intellectual journey that not only deciphers patterns but also seeks to understand the stories concealed within the numerical fabric. This chapter transcends the realm of mere statistical computation; it is a narrative woven through graphs, charts, and tables, enhancing the depth and richness of our exploration.





**Meticulous Data Analysis with Descriptive Statistics:**

The opening act of our data analysis involves the deployment of descriptive statistics. Mean, median, and mode are our guiding stars, offering a snapshot of central tendencies within our dataset. As we delve into the labyrinth of supply chain metrics and sustainability indicators, descriptive statistics provide the initial hues of our canvas. For example, mean lead times for suppliers can be juxtaposed against the median sustainability ratings, painting an intricate picture of the dual dimensions under scrutiny.

**Regression Analysis Unravelling Relationships:**

Regression analysis steps into the limelight, akin to a spotlight illuminating the stage, as we delve deeper into the intricate relationships between variables. This powerful tool allows us to navigate the complexities of the supply chain optimization and sustainability dance. It is through regression that we aim to discern not only correlations but potential causations, unravelling the dynamic interplay between optimization efforts and sustainability outcomes.

**Statistical Significance with T-Tests and Z-Tests:**

The theatre of statistical significance unfolds through the deployment of t-tests and z-tests. These tests become our discerning critics, evaluating the weight of our findings and determining their significance. For instance, a t-test may unveil the statistical significance of efficiency gains post-optimization, while a z-test may be employed to scrutinize sustainability scores across different supplier categories. These statistical examinations add layers of complexity and depth to our narrative.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Gender	60	1.45	.502	.065
How would you rate your overall satisfaction with apple services ?	60	3.97	1.193	.154
Do you think iPhone became cheaper after production in India ?	60	1.42	.497	.064
Do you use Apple Phone ?	60	1.33	.475	.061
Do you think that apple company supply chain practices and sustainability efforts impact its brand reputation loyalty as a customer ?	60	3.70	1.293	.167
Do Apple Company sustainability efforts influence your decision to purchase it's products ?	60	1.20	.403	.052
Are you aware of any initiative that apple company has taken to promote its recycling of their old devices ?	60	1.33	.475	.061
How do you perceive apple company's effort in optimizing its supply chain to ensure product availability and its timely delivery ?	60	3.75	1.230	.159

One-Sample Test							
	Test Value = 0						
	t	df	Significance		Mean Difference	95% Confidence Interval of the Difference	
			One-Sided p	Two-Sided p		Lower	Upper
Gender	22.388	59	<.001	<.001	1.450	1.32	1.58

How would you rate your overall	25.761	59	<.001	<.001	3.967	3.66	4.27
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satisfaction with apple services ?							
Do you think iPhone became cheaper after production in India ?	22.072	59	<.001	<.001	1.417	1.29	1.55
Do you use Apple Phone ?	21.726	59	<.001	<.001	1.333	1.21	1.46
Do you think that apple company supply chain practices and sustainability efforts impact its brand reputation loyalty as a customer ?	22.170	59	<.001	<.001	3.700	3.37	4.03
Do Apple Company sustainability efforts influence your decision to purchase it's products ?	23.043	59	<.001	<.001	1.200	1.10	1.30
Are you aware of any initiative that apple company has taken to promote its recycling of their old devices ?	21.726	59	<.001	<.001	1.333	1.21	1.46
How do you perceive apple company's effort in optimizing its supply chain to ensure product availability and its timely delivery ?	23.617	59	<.001	<.001	3.750	3.43	4.07

**INTERPRETATION:**

The graph is from a one-sample t-test, which is a statistical test used to determine if the mean of a sample



is statistically different from a hypothesized value (in this case, 0).

The table shows the results for seven questions related to Apple's supply chain and sustainability efforts. Here are the results for the two questions that specifically ask about those topics:

- Do you think that apple company supply chain practices and sustainability efforts impact its brand reputation loyalty as a customer? The t-statistic is 22.170 with a p-value of less than .001. So we can reject the null hypothesis, which means there is a statistically significant difference between the sample mean and the hypothesized mean of 0. The confidence interval is 3.700 to 4.03, so we can be confident that the average person believes that Apple's supply chain and sustainability efforts do impact customer loyalty by a score between 3.70 and 4.03 on a scale that isn't shown in the table.
- Do Apple Company sustainability efforts influence your decision to purchase it's products? The t-statistic is 23.043 with a p-value of less than .001. So we can reject the null hypothesis, which means there is a statistically significant difference between the sample mean and the hypothesized mean of 0. The confidence interval is 1.10 to 1.30, so we can be confident that the average person believes that Apple's sustainability efforts do influence their decision to purchase Apple products by a score between 1.10 and 1.30 on a scale that isn't shown in the table.

<b>One-Sample Effect Sizes</b>					
		Standardizer <sup>a</sup>	Point Estimate	95% Confidence Interval	
				Lower	Upper
Gender	Cohen's d	.502	2.890	2.309	3.466
	Hedges' correction	.508	2.853	2.280	3.422
How would you rate your overall satisfaction with apple services ?	Cohen's d	1.193	3.326	2.673	3.973
	Hedges' correction	1.208	3.283	2.639	3.922
Do you think iPhone became cheaper after production in India ?	Cohen's d	.497	2.849	2.275	3.419
	Hedges' correction	.504	2.813	2.246	3.375
Do you use Apple Phone ?	Cohen's d	.475	2.805	2.237	3.367
	Hedges' correction	.482	2.769	2.209	3.324
Do you think that apple company supply chain practices and sustainability efforts impact its brand reputation loyalty as a customer ?	Cohen's d	1.293	2.862	2.285	3.433
	Hedges' correction	1.309	2.826	2.256	3.389
	Cohen's d	.403	2.975	2.380	3.564

Do Apple Company sustainability efforts influence your decision to purchase it's products ?	Hedges' correction	.409	2.937	2.350	3.519
Are you aware of any initiative that apple company has taken to promote its recycling of their old devices ?	Cohen's d	.475	2.805	2.237	3.367
	Hedges' correction	.482	2.769	2.209	3.324
How do you perceive apple company's effort in optimizing its supply chain to ensure product availability and its timely delivery ?	Cohen's d	1.230	3.049	2.442	3.651
	Hedges' correction	1.246	3.010	2.411	3.604

a. The denominator used in estimating the effect sizes.  
 Cohen's d uses the sample standard deviation.  
 Hedges' correction uses the sample standard deviation, plus a correction factor.

Bayesian Estimates of Coefficients <sup>a,b,c,d</sup>					
Parameter	Posterior			95% Credible Interval	
	Mode	Mean	Variance	Lower Bound	Upper Bound
Do you think iPhone became cheaper after production in India ? = 1	1.229	1.229	.006	1.073	1.385
Do you think iPhone became cheaper after production in India ? = 2	1.447	1.447	.009	1.262	1.631

a. Dependent Variable: Do you use Apple Phone ?  
 b. Model: Do you think iPhone became cheaper after production in India ?  
 c. Regression Weight Variable: How do you perceive apple company's effort in optimizing its supply chain to ensure product availability and its timely delivery ?  
 d. Assume standard reference priors.

Bayesian Estimates of Error Variance <sup>a</sup>					
Parameter	Posterior			95% Credible Interval	
	Mode	Mean	Variance	Lower Bound	Upper Bound
Error variance	.773	.828	.025	.573	1.194

a. Assume standard reference priors.

Bayesian Estimates of Coefficients <sup>a,b,c,d</sup>					
Parameter	Posterior			95% Credible Interval	
	Mode	Mean	Variance	Lower Bound	Upper Bound
Do you think iPhone became cheaper after production in India ? = 1	1.229	1.229	.006	1.073	1.385
Do you think iPhone became cheaper after production in India ? = 2	1.447	1.447	.009	1.262	1.631

a. Dependent Variable: Do you use Apple Phone ?  
 b. Model: Do you think iPhone became cheaper after production in India ?  
 c. Regression Weight Variable: How do you perceive apple company's effort in optimizing its supply chain to ensure product availability and its timely delivery ?  
 d. Assume standard reference priors.

Its a Bayesian analysis to understand the relationship between perceptions of Apple's supply chain optimization efforts, the perception of iPhone becoming cheaper after production in India, and the usage of Apple phones. Here's an interpretation of the supply chain and sustainability of Apple based on the provided information:

**1. Perception of iPhone Becoming Cheaper After Production in India:** The Bayesian estimates of coefficients suggest that respondents who believe iPhones became cheaper after production in India are more likely to use Apple phones. Specifically, those who strongly agree (value = 2) have a higher coefficient (1.447) compared to those who somewhat agree (value = 1, coefficient = 1.229). These coefficients indicate a positive association between the perception of iPhone price reduction and the likelihood of using Apple phones.

**2. Perception of Apple's Supply Chain Optimization:** The regression weight variable represents perceptions of Apple's efforts in optimizing its supply chain to ensure product availability and timely delivery. However, the specific impact of this perception on the usage of Apple phones is not explicitly provided in the summary. It's mentioned as a part of the model, suggesting its importance in understanding the relationship between perceptions and usage, but further analysis or interpretation is needed to determine its significance.

**3. Error Variance:** The Bayesian estimates of error variance provide insights into the variability of the data not explained by the model. A lower error variance suggests that the model accounts for a larger proportion of the variability in the dependent variable, which could indicate a better fit of the model to the data. In this case, the error variance is estimated to be between 0.573 and 1.194 with a mean of 0.828, indicating some variability in the data not accounted for by the model.

In summary, based on the provided Bayesian estimates, there appears to be a positive relationship between the perception of iPhone becoming cheaper after production in India and the usage of Apple phones. However, the specific impact of perceptions of Apple's supply chain optimization efforts on phone usage requires further analysis. Additionally, the error variance estimates provide insights into the variability of the data not explained by the model.

## **Chapter 5: Findings, Conclusion, Limitations, and Suggestions**

### **Findings:**

The analysis conducted in this study aimed to investigate the perceptions regarding Apple's supply chain optimization efforts, the perception of iPhone becoming cheaper after production in India, and its impact on the usage of Apple phones. Through Bayesian analysis and one-sample t-tests, several key findings emerged:

- 1. Perception of iPhone Becoming Cheaper After Production in India:** The Bayesian estimates of coefficients revealed a significant positive association between the perception of iPhone price reduction after production in India and the likelihood of using Apple phones. Respondents who strongly agreed that iPhones became cheaper after production in India showed a higher likelihood of using Apple phones compared to those who somewhat agreed. This finding suggests that perceptions of cost reduction in iPhone production influence consumer behavior towards Apple products.
- 2. Perception of Apple's Supply Chain Optimization:** While the analysis included a regression weight variable representing perceptions of Apple's supply chain optimization efforts, the specific impact on phone usage was not explicitly provided. Further investigation is warranted to understand the significance of this variable and its role in influencing consumer behavior towards Apple products.
- 3. Error Variance:** The Bayesian estimates of error variance highlighted the variability in the data not accounted for by the model. This variability suggests that while the model provides insights into the relationship between perceptions and usage of Apple products, there are other factors contributing to consumer behavior that are not captured by the current analysis.
- 4. Effect Sizes:** Effect sizes, measured through Cohen's  $d$  and Hedges' correction, indicated the magnitude of differences in perceptions across various factors related to Apple's supply chain and sustainability efforts. Larger effect sizes were observed for perceptions related to overall satisfaction with Apple services and perceptions of Apple's supply chain optimization efforts.

### **Conclusion:**

Based on the findings of this study, several conclusions can be drawn regarding the impact of perceptions of Apple's supply chain and sustainability efforts on consumer behavior:

- 1. Positive Perception of iPhone Price Reduction:** The significant positive association between the perception of iPhone becoming cheaper after production in India and the usage of Apple phones suggests that cost considerations play a crucial role in consumer decisions. Apple's efforts to reduce production costs and pass on the benefits to consumers may enhance brand loyalty and product adoption.
- 2. Importance of Supply Chain Optimization:** While perceptions of Apple's supply chain optimization efforts were included in the analysis, further investigation is needed to understand their direct impact on consumer behaviour. Supply chain optimization can influence product availability, timely delivery, and overall customer satisfaction, all of which are important factors in consumer decision-making.
- 3. Impact of Sustainability Efforts:** The analysis also revealed the influence of Apple's sustainability efforts on consumer behaviour. Perceptions of sustainability initiatives positively impacted brand reputation, loyalty, and purchase decisions. This suggests that consumers are increasingly considering sustainability practices when making purchasing decisions, highlighting the importance of corporate social responsibility in today's market.
- 4. Limitations and Future Directions:** Despite the insights provided by the analysis, there are several

limitations to consider. The study focused on perceptions rather than actual behaviors, which may not fully capture consumer actions. Additionally, the sample size and demographic characteristics of the respondents were not provided, which could impact the generalizability of the findings. Future research could explore the relationship between perceptions and actual behaviors, incorporate a larger and more diverse sample, and consider additional factors that may influence consumer decisions, such as product features, pricing strategies, and competition.

### **Limitation for Apple:**

The findings of this study have important implications for Apple and its marketing strategies. By emphasizing cost reduction, supply chain optimization, and sustainability efforts in its communications with consumers, Apple can enhance brand loyalty, increase product adoption, and differentiate itself in the competitive market. Understanding consumer perceptions and preferences can inform product development, marketing campaigns, and corporate social responsibility initiatives, ultimately driving business success and societal impact.

Overall, the findings of this study underscore the importance of considering consumer perceptions of supply chain and sustainability efforts in shaping purchasing decisions and brand loyalty. By aligning corporate strategies with consumer preferences, companies like Apple can not only drive financial performance but also contribute to environmental sustainability and social responsibility.

Questionnaire: Title: Sustainability of Apple

Name. \_\_\_\_\_

Gender:

- Male
- Female
- Prefer not to say

Age:

- Below 18
- 18-25
- 26-35
- 36-45
- Above 46

Do you use Apple Phone ?

- Yes
- No

Do you think iPhone became cheaper after production in India ?

- Yes
- No

How would you rate your overall satisfaction with apple services ?

- 1 (Strongly Disagree)
- 2
- 3
- 4

- 5 (Strongly Agree)

Do Apple Company sustainability efforts influence your decision to purchase its products ?

- Yes
- No

How do you perceive apple company's effort in optimizing its supply chain to ensure product availability and its timely delivery ?

- 1 (Strongly Disagree)
- 2
- 3
- 4
- 5 (Strongly Agree)

Do you think that apple company supply chain practices and sustainability efforts impact its brand reputation loyalty as a customer ?\*\

- 1 (Strongly Disagree)
- 2
- 3
- 4
- 5 (Strongly Agree)

Are you aware of any initiative that apple company has taken to promote its recycling of their old devices?

- Yes
- No

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