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**Consumer Preferences for Sustainability and its Impacts on Strategic Management  
Processes in the Chemical Industry: An Exploratory Investigation**

By: Levi Paul Little

An Undergraduate Thesis Submitted in Partial Fulfillment of the Requirements for the University  
Honors Scholars Program in the Honors College and  
the Department of Economics and Finance, College of Business and Technology  
East Tennessee State University

April 27, 2022



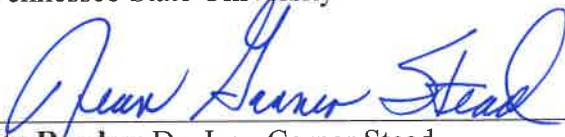
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## ABSTRACT

Consumer Preferences for Sustainability and its Impacts on Strategic Management Processes in the Chemical Industry: An Exploratory Investigation

Levi Little, James Harlan, AFG Chair of Excellence, College of Business and Technology and Jean Stead, Professor Emerita, Department of Management and Marketing, College of Business and Technology, East Tennessee State University, Johnson City, TN.

The ability to create and implement sustainable business operations has become increasingly important for chemical firms to keep up with ever-growing consumer demands for sustainability. This thesis is an exploratory investigation designed to examine the strategies and decisions made by top management of select chemical firms while dealing with consumer pressures for sustainable products and processes. The implementation of specific structures and processes were studied to measure the extent chemical firms have taken for sustainable operations. These measures of the strategic processes of the firms studied include corporate vision, mission, and goals, sustainability structure, product offerings, supply chain management, reporting, and external recognition. The literature is in agreement that chemical firms and consumer preferences have each significantly shifted towards sustainability in the past two decades. This study seeks to look at the development of key sustainability indicators and the role consumer pressures had in development of more sustainable operations. The indicators were analyzed through qualitative case studies of three chemical firms, each representing a different sector of the chemical industry's value chain, DowDuPont, Eastman Chemical Company, and Procter & Gamble. The results of the case studies are expected to indicate that consumer preferences have pressured chemical firms to implement sustainable processes into their strategic management operations. The results could be used for further research and quantitative analysis.

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## CHAPTER 1

*“Sustainability is the integration of environmental health, social equity, and economic vitality in order to create thriving, healthy, diverse, and resilient communities for this generation and generations to come,” -UCLA Sustainability Committee, 2016*

### INTRODUCTION

This thesis is a qualitative study into the strategies and decisions made by top management of several chemical firms while dealing with consumer pressures for sustainable products and processes. This thesis details an in-depth study focusing on three firms along the chemical industry value chain, ranging from supply and acquisition firms, intermediary firms, and consumer consumption firms. Descriptive research on these firms’ corporate vision, sustainability structure, product offerings, supply chain management, reporting, and external recognition will be the basis of how sustainable strategic management is measured.

#### **Research Scope**

In studying the development of sustainable management strategies within the chemical industry, emphasis is placed on the firm’s corporate vision, sustainability structure, product offerings, supply chain management, reporting, and external recognition as measurements of the impacts consumer demands have had on the strategic management processes. The goal of this study is to not to determine the efficacy of these firm’s strategic management processes, but to recognize their progression as results of consumer pressure. Because of this, the scope of this research is limited to an investigation of these variables as they relate to an implementation of the firm’s strategic management processes.

#### **Limitations**

A limitation of this study is that it is a qualitative case study. Although this limitation will

be discussed more thoroughly in the methodology chapter, it should be noted here that the author has applied the most current case methodologies in an attempt to minimize this limitation.

Another limitation is the sample size of the case studies involved within the research. This research will only be investigating three firms among hundreds along the chemical industry value chain. This small sample size could affect statistical data conducted from additional quantitative research based off the hypothesis of this study.

The final limitation noted within this study is the potential for researcher bias to affect what secondary data the researcher chooses to look at and include as part of the study. While this is not intentional bias, researcher values will go into choosing what data to look at.

### **Purpose of the Study**

The purpose of this research is to investigate the impacts consumer demands for sustainability have had on the strategic management processes of chemical firms. As stated in the Research Scope section, the purpose of this study is not to make a value judgment on the morality or ethics of strategic management processes among chemical firms, nor to analyze the positive and negative effects these processes have had on the environment or ecosystem. This study will be noting the development of strategic management processes as a result of consumer demands.

The following is a brief description of the strategic management processes that will be measured for sustainability.

- Corporate vision, mission, goals- A corporation's vision is a long-run view of how the company sees themselves in the future (*Corporate Vision*). When a firm has a vision for sustainability, the mission of the firm will shift and goals will be implemented in order to achieve this vision and mission. Many firms now have active sustainability visions and

missions, often in the form of mission statements, the inclusion of these statements can be observed as part of the firm's strategic management processes.

- Sustainability structure- Structuring for sustainability is the managerial undertaking of implementing the firm's vision, mission, and goals into real life structures and processes within the firm. These can include taskforces, departments, and projects aligned with the firm's sustainable vision, mission, and goals.
- Product offerings- Is the firm making an effort to increase product offerings that are sustainably made? Is there a decrease in products that are unsustainable in either acquisition or production? This is an important part in strategic management processes.
- Supply chain management- Sustainable supply chain administration includes coordinating environmentally and fiscally reasonable practices into the total supply chain lifecycle, from product design and production to raw material extraction, manufacturing, packaging, transportation, warehousing, distribution, consumption, and disposal. Sustainable supply chain administration and processes can help firms not only in decreasing their total carbon footprint, but moreover in optimizing their end-to-end operations to realize heightened profitability. All supply chains can be enhanced utilizing strategic management practices.
- Reporting- Sustainability reporting allows firms to audit and narrate the steps the firm has taken to perform in a sustainable way. This variable allows stakeholders and the general public to assess the progress firms have made towards sustainable strategic management, and a chance for firms to gain reputational capital by being transparent about promises made about operating sustainably.
- External recognition- External recognition can come from industry leaders, science



foundations, and reputable business journals and organizations to award firms who have taken steps towards sustainable strategic management processes. Similar to reporting, firms have incentive to strive towards objectives that will award them these recognitions. Winning such awards can express to consumers that firms are making efforts to meet demands for sustainability.

### **Description of Terms**

*Chemical Industry.* “The chemical industry consists of the companies that produce industrial chemicals. This industry utilizes chemical processes such as chemical reactions and refining methods to convert raw materials—such as oil, natural gas, air, water, metals, and minerals—into more than 70,000 different products. These products include petrochemicals, agrochemicals, ceramics, polymers and rubber (elastomers), oleochemicals (oils, fats, and waxes), explosives, fragrances, and flavors. The chemical industry is, thus, central to the modern world economy (Chemical industry).”

*Strategic Management.* “Involves analyzing, formulating, and implementing business strategies that are economically competitive, socially responsible, and in balance with the cycles of nature (Stead, J.G and Stead, W.E.).”

*Value Chain.* “An industry’s value chain is typically part of a larger value system that includes companies either upstream (suppliers) or downstream (distribution channels), or both. This perspective about how value is created forces managers to consider and see each activity not just as a cost, but as a step that has to add some increment of value to the finished product or service (Value chain).”

### **Conclusion**

Studies show a dramatic increase in consumer preferences for sustainability within the

global market. Specifically in the chemical industry, an industry marred with environmental scandals, how have these firms responded? What structures, products, and processes have these firms implemented as a result of consumer preference? These are the questions which will be addressed by this research.

## CHAPTER 2

### REVIEW OF LITERATURE

#### **Introduction**

A recent study conducted in July of 2020 by Capgemini Research Institute deducted that up to seventy-nine percent of consumers are willing to change their product preferences based on the corporation's sustainability initiatives, driven by strategic management. This is contrasted greatly in the same study which found that only thirty-six percent of organizations believe that consumers are willing to make changes in preferences depending on sustainable operations (Capgemini, 2). Sustainability is no longer a marketing niche for firms to use to their favor. Sustainability is a requirement in developed markets and a priority in emerging markets as well, with ninety-seven percent of Indian consumers and ninety-six percent of Colombian consumers, two of the largest emerging markets, citing sustainability as a precedent for purchase (Wilson). There exists a wide variety in the literature detailing the history in the changes in consumer preferences in sustainability and changes specifically within the chemical industry. Narrative and historical analysis of this literature will be used to document the existing and continuing changes in consumer preference.

#### **Changes in Consumer Preference**

##### *1960's & 1970's: The Beginning*

*Silent Spring* by Rachel Carson, published on September 27, 1962 is largely credited as

the literature beginning the environmental movement within the United States (Meyer). Carson's work was mainly focused on the inappropriate and irresponsible use of synthetic pesticides, specifically DDT (Dichlorodiphenyltrichloroethane). DDT was developed in the 1940's as the first widely used synthetic pesticide. The use of DDT expanded greatly across the United States due to its ability to combat a wide variety of biological and agricultural diseases including typhus, malaria, and a plethora of crop-killing insects ("DDT"). Carson detailed how the irresponsible use of agricultural pesticides and other chemicals polluted water reservoirs, sabotaged local ecosystems, and posed a real threat to human health as well ("Legacy"). The publication of *Silent Spring* sparked one of the first national dialogues relating the actions of corporations to environmental wellbeing, public health, and the social economy ("Sixties"). This momentum led to the passing of the Water Quality Act, Noise Control Act, and the Solid Waste Disposal Act in 1965.

While strides were taken towards sustainability during the 1960's, it was largely in part to the work of researchers and activists rather than by demand of consumers. In fact, contrary to willingly supporting calls made by activists, many American corporations ran vigorous smear campaigns against activist groups. This curbed the movement to the fringes of social dialogue and created the stereotype of environmental activists as "hippies" and "tree-huggers". This was largely propagated by the fact the average American consumer had little access to scholarly research or environmental information regarding sustainability other than marketing campaigns run by firms profiting off unsustainable business processes.

The end of the 1960's was highlighted by the UNESCO (United Nations Educational, Scientific, and Cultural Organization) "Man and His Environment: A View Towards Survival" conference in San Francisco, California. The conference was in preparation the Stockholm

Conference on the Environment in 1972 and was attended by some of the greatest American scientific and university minds of the time (“Sixties”). Dr. Earl Finbar Murphy, law professor at Ohio State University, summarized the dealings of the meeting in his pamphlet *Man and His Environment*. Topics discussed included global food supply for a rapidly increasing international population, nuclear energy as a replacement for fossil fuels, and political versus industrial incentives for sustainability guidelines (Murphy). While the literature and movements in the 1960’s began the conversation towards corporate sustainability, progress and pressure were largely propagated by academics and politicians rather than consumers.

The continuation of the environmental movement in the early 1970’s was driven by the passing of the National Environmental Policy Act by Congress in late 1969, and the formation of the Environmental Protection Agency (EPA) in early 1970 by President Richard Nixon. The environmental movement thus far had mainly focused on the protection of clean air and water by political acts. However, in the 1970’s this responsibility began to be shifted towards corporations. Professor Sandra Holmes’s 1976 article, “Executive Perceptions of Corporate Social Responsibility” discussed how the “classical view” of business focused on economic efficiency in the production of goods and services with the sole purpose of profit, is unsustainable (Holmes, 34).

Moreover, perhaps the greatest environmental event of the 1970’s was not focused on corporations, but on the mishandling of 2, 3, 7, 8-tetrachloro-dibenzo-para-dioxin, more commonly known as Agent Orange, by the United States military in the Vietnam War. The Vietnam War was a deeply divisive and controversial topic in the early 1970’s, anti-war sentiments were strong among the U.S. public and the use of biological warfare was particularly controversial (Veterans). Consequently, short-term effects of the herbicide Agent Orange were

evaluated by the American Chemical Society in 1971 and the National Institute of Environmental Health Science in April 1973 (*Veterans*). The findings of these forums found that Agent Orange was the most toxic of all chlorodibenzodioxins known at the time with the liver being the main organ affected by exposure, a delay in symptoms following exposure, and the extent of symptoms still unknown at the time (Young, A.L. & Reggiani, G.M.,1988).

The development of the study of Agent Orange effects and the transition from anti-war veteran sentiment to veteran sympathy is documented prominently by books *Agent Orange on Trial* by Peter H. Schuck, *Kerry: Agent Orange and an American Family* by Clifford L. Linedecker, and *Waiting For an Army to Die* by Fred A. Wilcox. In contrasting research and narrative forms, authors Schuck, Linedecker, and Wilcox document how by the mid-to-late 1970's, veterans were being diagnosed with various forms of cancer (Schuck, 1987). This research became high-profile public information thanks to the work of Maude deVictor a benefits officer working in the Chicago Veterans Administration (VA) office (Wilcox, 1983). deVictor continued to study the effects of Agent Orange, specifically about Vietnam veteran Charles Owen who had been diagnosed and died with terminal cancer. After learning that the VA had denied Owen's widow's claim for benefits, deVictor was sanctioned by the United States Air Force to cease her research (Wilcox, 1983). deVictor however, did not stop her research on Agent Orange and compiled statistics about veterans who visited the Chicago VA and had been exposed. This research was picked up by local television reporter Bill Kurtis who created the documentary, *Agent Orange, The Deadly Fog* which aired on WBBM, a Chicago CBS affiliate in March of 1978 (Linedecker et al., 1982). Also in 1978, Paul Reutershan made national news by appearing on the "Today" Show and announcing, "I died in Vietnam, but I didn't even know it" (Wilcox, 1983). Reutershan died of liver and colon cancer, contributed to Agent Orange, on

December 14, 1978 at the age of 28 (Schuck, 1987). Today it is estimated that over three-hundred thousand veterans have died of Agent Orange exposure. This number is roughly five times the number of veterans who died in combat during the Vietnam War (Foster).

The 1960's and 1970's were a tumultuous two decades in American history full of international and domestic conflicts and shifting perceptions about modern industry and how it impacts the world. It was also the time in American history where the environmental movement took off among activists, academics, and policy makers. The struggle through much of these two decades was shifting this urgency from these niche groups of people into the average consumer. Everyday Americans saw the potential dire consequences the mishandling of chemical products and unsustainable operating processes can have on the environment and people. The next two decades were pivotal in driving that momentum into consumer pressure to business organizations.

#### *1980's & 1990's: The Movement*

The 1980's saw continued progress made for corporate sustainability, as well as increased consumer interest in sustainability efforts largely propagated by research collected over the past two decades concerning environmentalism. Additionally, several global events concerning sustainability pushed sustainability and corporation's involvement further into the general public's eye. The 1980's were highlighted by the Bhopal and Chernobyl chemical and energy disasters, as well as the emergence of green marketing as corporations sought to reflect and please the changing consumer landscape.

With the sustainability movement being firmly established at this point through the work of the last two decades, the United Nations Charter for Nature passed on October 28, 1982 with 111 votes in favor and one opposing vote belonging to the United States ("The Eighties"). The

charter had four primary principles of conservation creeds which are as follows:

- “Nature shall be respected and its essential processes shall not be impaired”
- “The genetic viability on the earth shall not be compromised; the population levels of all life forms, wild and domesticated, must be at least sufficient for their survival, and to this end necessary habitats shall be safeguarded.”
- “All areas of the earth, both land and sea, shall be subject to these principles of conservation; special protection shall be given to unique areas, to representative samples of all the different types of ecosystems and to the habitats of rare or endangered species.”
- “Ecosystems and organisms, as well as the land, marine and atmospheric resources that are utilized by man, shall be managed to achieve and maintain optimum sustainable productivity, but not in such a way as to endanger the integrity of those other ecosystems or species with which they coexist (United)”.

While this was a great moment for the development of global sustainability, the one opposing vote from the United States was alarming for conservation efforts within the U.S. and emphasized the work still to be done.

The chemical industry was at the forefront of the global sustainability and responsibility discussion during the 1980's largely due to the misuse of Agent Orange in the 1970's and the fallout of the Bhopal Gas Tragedy in December of 1984 (“What”). The morning of December 3, 1983 saw the Indian city of Bhopal and the surrounding villages transformed into a gas chamber as 30 tons of methyl isocyanate poisoned upwards of 600,000 people and killed 15,000 (“What”). The methyl isocyanate was being processed in an Indian subsidiary of the American Union Carbide Corporation. Author and journalist, Sanjoy Hazarika, who originally covered the Bhopal Gas Tragedy for The New York Times, wrote about this disaster in her 1987 novel *Bhopal: Lessons of a Tragedy*. Hazarika explores the complications of Western multinational corporations setting up industry in then third-world countries without the resources or personnel to manage and operate said industry (Hazarika, 1987). The fallout of Bhopal in the United States was immediate. Warren Anderson, CEO of Union Carbide, attempted damage control, especially in the rural community of Jefferson, West Virginia where a plant, similar to the one in Bhopal,



resided (Mullin). The residents were assured that they had nothing to fear, but this reassurance proved faithless as less than a year after the Bhopal Tragedy, an accidental release of aldicarb oxime and methylene chloride sent 135 Jefferson plant workers to the hospital (Mullin, 2019). “We no longer wanted to think of a polluted environment as normal.” This quote from Ann Green, president of Ann Green Communications and Jefferson, West Virginia resident encapsulates the development of consumer preference in the 1980s.

One of the direct results of the Bhopal Gas Tragedy was the development of the principles of Responsible Care® by the Canadian Chemical Producer’s Association and Dow Canada in 1985 (Belanger et al, 2009). The Bhopal Gas Tragedy was seen as one of the most abhorrent mistakes of the chemical industry’s carelessness in the 1960’s, 70’s, and early 80’s. After the Tragedy, the chemical industry felt it was risking its public license to produce due to negative media attention and political pushback. The early objectives of responsible care dealt with cultivating a corporate leadership structure which supported safe chemical management, sought to safeguard people and the environment, strengthen chemical management systems globally, and engage with stakeholders voicing concerns over unsafe management practices (“Responsible”). Much of the discourse concerning Responsible Care® was about, “doing no harm” when it came to the management and operations of the chemical industry (Belanger et al, 2009). Even though the ideas and governance of Responsible Care® began in Canada, it was quickly adopted by many firms in the United States and over 50 countries through their respective national chemical associations (Belanger et al, 2009). Responsible Care® was potentially the first industry-led reaction to consumer and public pressure for reform within the chemical industry, and its impact would expand far beyond its conception in 1985.



By the end of the decade, with nearly three decades of environmental activism working through the United States, the late '80s saw an explosion of firms attempting to capitalize on green consumer preference. Additionally, *Our Common Future*, published by the United Nations in October 1987 sought to further frame the responsibility of sustainability on politics and corporations rather than activists and individuals (Brundtland, 1987). The difference between this effort by the United Nations and similar efforts in past decades was expanding pressure from consumers for sustainability and financial incentives for corporations to cater to these preferences. In 1988, authors, entrepreneurs and authorities on corporate accountability and sustainable growth John Elkington and Julia Hailes penned the immensely popular *The Green Consumer Guide*. This book, one of the first of its kind, saw authors Elkington and Hailes identifying prominent environmental issues and emphasizing the importance of being an environmentally mindful consumer (Elkington & Hailes, 1988). *The Green Consumer Guide* listed the chemical composition of certain products across industries and creating resource lists for consumers based on sustainability values of firms. The book was wildly popular, selling over one million copies in the first year of publication. Immediately, popular brands came under fire for issues ranging from environmental pollution to nonrecyclable materials (Meyer, 2010). In late 1988 and early 1989, McDonalds was famously boycotted for their use of nonrecyclable polystyrene plastics in their packaging (Meyer, 2010). Barely a year later McDonalds had switched completely to recyclable paper packaging. This is simply one example of changes made by firms to placate consumers. By 1989, sustainable products in American markets doubled and represented more than ten percent of all new commodity products (Meyer, 2010).

This attitude was continued into the 1990's with continued sustainable legislation and a stark increase in consumer driven green brands. At the turn of the decade, the U.S. Clean Air Act

mandated cleaner diesel and gasoline fuels for less atmospheric pollution (“Timeline”). Additionally, the emergence of eco-conscious firms such as Burt’s Bees and Whole Foods represented a niche but mainstream retail phenomenon (Meyer, 2010). A nationwide study conducted by James Roberts and published in the July 1996 *Journal of Business Research* found that by the mid 90’s, 45% of consumers believed their individual market choices could help to increase sustainability and solve environmental problems (Roberts, 1996). This is reflected both in the marketplace actions made by firms and in the stances, politicians began to run on to garner mainstream voter and consumer support.

Keith Schneider, a reporter for *The New York Times* covered the 1992 Presidential Debate where incumbent president George H.W. Bush and Arkansas governor challenger Bill Clinton came to a head over environmental issue. President Bush campaigned a stance favoring the creation of new short-term jobs at the expense of environmental protection roll backs (Schneider, 1992). Critics of Bush highlight his environmental policies regarding the opening of protected wetlands to development, drilling for oil in the Arctic National Wildlife Refuge, allowing strip mining for coal in national forests, hindering the success of the 1990 Clean Air Act, and finally, issuing “the strongest attack a President has ever issued against the Endangered Species Act” (Schneider, 1992). Clinton, on the other hand, claimed the narrative that the environment needed to be sacrificed in order to create jobs a false narrative. Clinton stressed the importance of enforcing the already existing sustainability protocols for environmental and energy issues. Clinton also proposed the introduction of tax incentives for firms willing to follow sustainability protocols (Schneider, 1992). Clinton was also heralded by sustainability activists and consumers for his pick of running mate, Tennessee politician, environmental author and expert, Al Gore. Gore became a somewhat controversial political figure for his written works in the early 1990’s

such as *Earth in the Balance* and *Common Sense Government*. In fact, Michael E. Mann in the July issue of *Nature* magazine states that, “Nobody has been more vilified for their efforts to communicate the climate threat than Al Gore” (Mann, 2017). This controversy surrounding Gore as the Vice-Presidential pick highlights the growth environmentalism and sustainability had among American voters, and by proxy, consumers as well. In a September 1992 *Los Angeles Times* article cites, “Perhaps no two presidential candidates ever have devoted more attention to the issue of environmental protection than George Bush and Bill Clinton have in recent months” (“Bush”). In fact, one of President Bush’s primary 1988 platforms that garnered him the presidency was his devotion to running as an, “environmental President” (“Bush”). While he was initially successful in this promise, Bush displayed a clear unwillingness to risk potential job losses and corporate protections over sustainable policy. Clinton and Gore on the other hand, ran with their bold environmental policies, including corporate tax incentives and punishments, as a central theme of their campaign (Nie, 1997). With the two winning the 1992 presidential election, their victory came at the price of lofty environmental promises that voters/consumers expected them to keep. Educator and environmental activist, Martin A. Nie found that following Clinton’s victory, sixty-four percent of the voting electorate had more confidence in the Democratic president and congress as opposed to only eighteen percent having more faith in the past Republican administrations (Nie, 1997). This measurement of environmental voting habits reflects the ever-growing call for sustainability for both American leadership and industry.

The mid and late 1990s also saw the rise of another consumer driven sustainable singularity, socially responsible investing (SRI). SRI, also referenced as green or ethical investing, holistically can be traced back to John Wesley and the money management practices of the Methodist Church in the 1700’s (Donovan, 2022). Specifically, however, SRI as it is

practiced today began to take shape during the late 1980's and came to prominence during the mid-1990's (Cautero, 2019). In its simplest form Donovan states that SRI, "is an investing interest strategy in which investors develop standards to invest only in businesses that strive to abide by acceptable social values (Donovan, 2022). The Domini Social Index launched in 1990 (now the MSCI KLD 400 Social Index) was made up of four hundred publicly tradable U.S. companies which helped to disprove the claims that socially responsible funds would produce lower yields than traditional funds ("History"). The growth of SRI is a driver for corporate sustainability over the next two decades up to the present day.

#### *2000's & 2010's: The Turn of the Millennia*

The turn of the millennia is where the greatest shifts in measurable corporate sustainability have taken place. In 2001, the Green Chemistry Institute which developed in the mid-1990s, officially joined the American Chemical Society ("Green"). There has been a dramatic in both sustainable firms and sustainable consumption in the last twenty years. Hall, Hodges, Khachatryan, and Palma state that from 2013 to 2018, measurable green industry contributions accounted for a 16.2% increase for employment and 17.3% for GDP (adjusted for inflation) (Hall, et al. 2020). Not only were corporations forced to become more transparent because of the greater ease of access the public, and particularly shareholders, had about day-to-day operation, but many found that this strategy was in the best interest of the firm as consumer preferences continued to shift.

Additionally, as indicated by Figure 1., the science behind global warming and the role annual carbon and greenhouse emissions were having on rising global temperatures began to develop more clearly. Since 1950, carbon dioxide emissions have gone from 50 billion tons annually to over 35 billion tons, over a 700% increase (Ritchie & Roser, 2019).

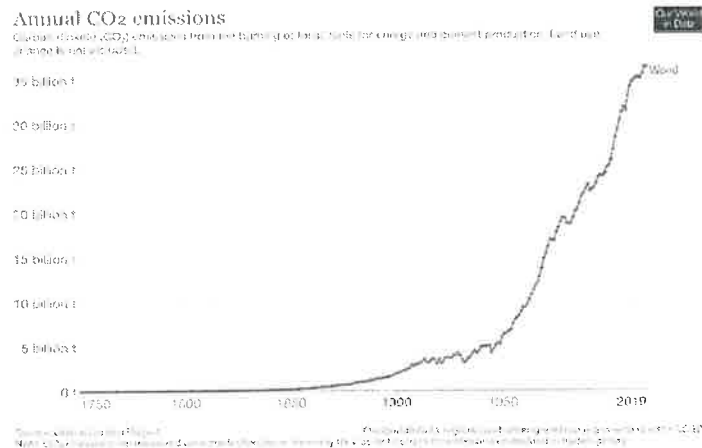


Figure 1.

### 2020 to Present Day

The narrative for sustainability in the new decade, starting with 2020, is dominated by the global Covid-19 pandemic. In addition to the devastation Covid-19 brought about as a public health crisis, the virus has also decimated the global supply chain and multi-national operating logistics. Author Amy Emmert, in a July article for *Strategy + Business*, cites a June 2021 *Global Consumer Insights* Pulse Survey which found that in the two years since the beginning of the pandemic, 50% of all global consumers responded they have become even more eco-friendly (Emmert, 2021). What has driven this massive jump in the already prominent expectation for sustainability? In a study performed by the Capgemini Institute, surveys find that consumer ideas and preferences have been largely influenced by the Covid-19 pandemic. Some of the key findings of this study concerning Covid-19's influence on consumer preference are as follows:

- “67% of consumers said they will be more conscious about the scarcity of natural resources due to the Covid-19 crisis.”
- “65% said that they will be more mindful about the impact of their overall consumption in the ‘new normal’.”
- “78% of consumers believe that companies have a larger role to play in society.”
- “A majority (over 53%) prefer to engage with CPR companies that showcase strong sustainability credentials and embody a sense of purpose” (“How”).

While this study shows the consumer's existing preference for practicing sustainability, it also found that sixty-two percent of consumers are willing to switch to products and firms which continue to strive for higher levels of sustainability and environmental safety ("How"). Based on data from current literature and research, the effects of the Covid-19 pandemic seem to have grouped sustainable consumers together in an even greater way and highlighted the ease in which global consumption can be disrupted. This shift in attitudes has provided an avenue for even greater sustainable industry growth in the decades to come.

## **CHAPTER 3**

### **METHODOLOGY**

#### **Introduction**

The purpose of this chapter is to explain the methodology used in investigating the relationship between consumer preferences and strategic management decisions of chemical firms. This chapter entails a justification of the research design theory that has been utilized for this research as well as a justification for the three firms chosen to represent the chemical industry value chain. The methodology of this chapter is modeled after Saunders et al, "Research Onion Theory" (2007) as a way to clearly outline and identify why the research has been structured as such. Once the research design theory has been set and justified, the justification of the firms selected and the strategic management measurables will occur, the research matrix introduced, and data collection will be fleshed out.

#### **Research Design Theory**

##### *Research Philosophy*

As with most qualitative studies, this research employs an interpretivist research philosophy. Interpretivism comprises researchers to interpret fundamentals of the study, largely

through social construction such as language, consciousness, shared meaning, and structures (“Interpretivism”). Myers (2008), finds that most business case studies use an interpretivist research philosophy as it lends itself to the observational nature of business research.

Additionally, Saunders, Lewis, and Thornhill (2012), deduct that interpretivism emphasizes qualitative analysis over quantitative analysis. Given the fact that this study is qualitative by nature and contains no quantitative analysis, interpretivism is the research philosophy used.

### *Research Type*

Due to the exploratory nature of this study, research was directed in an inductive nature. This means that the research was built from the ground up. Goddard and Melville conclude that inductive research focuses on patterns, regularities in experience, and certain resemblances which are used to generate research hypotheses rather than quantitative conclusions (Goddard & Melville, 2004). This study will conclude with the generation of a hypotheses, not a statistical or causal conclusion, making the inductive research type applicable to this study.

### *Research Strategy*

The nature of this research lends itself towards a case study research strategy. Crowe et al. finds that, “The case study approach is particularly useful to employ when there is a need to obtain an in-depth appreciation of an issue, event or phenomenon of interest, in its natural real-life context (Crowe et al, 2011). This made the case study approach applicable to this study as three different chemical firms were examined across the chemical industry value chain.

The Robert Wood Johnson Foundation for Qualitative Research identifies several key characteristics of case study research:

- The investigators identify the boundaries, and these boundaries (what is and what is not a case) are continually kept in focus.
- A case may be simple or complex. It may be a single patient, a practice, a health care system.



- The goal in case study research is to understand the boundaries of the case and the complexity of the behavior patterns of the bounded system.
- Researchers may study a single case or multiple
- cases. In multiple case studies, researchers study cases in depth individually as well as look across cases for similarities and differences (“Case”).

Essentially, the research case study can be used for multiple items of research (cases) to garner a thorough and concentrated investigation of a condition or set of conditions. This research strategy is applicable to this study as we look to perceive three different firms and the development of specific strategic management variables over time.

#### *Time Horizon*

The strategic operations measurements of the three firms represented in the case study will be measured at three different points in time: 2000, 2010, and 2021. This makes the time horizon of the study longitudinal in nature. The Institute for Work and Health fleshes out the importance of longitudinal research and the benefit of being able to, “detect developments or changes in the characteristics of the target population at both the group and the individual level. The key here is that longitudinal studies extend beyond a single moment in time. As a result, they can establish sequences of events” (“Cross”). Given that this study seeks to outline the development of strategic management processes of our three firms, a longitudinal study makes the most sense since the research is geared toward said development over a time period not a singular moment in time.

#### *Sampling Strategy*

The sampling strategy for this research involved a non-probability and non-randomized research sample. Since the three firms and the strategic management operations measurements were selected by the researcher, both the firms and measurements researched in this study are non-probable samples. Additionally, the firms and variables in this study are non-randomized,



meaning not all members of the population had an equal chance of being selected since firms and variables were subjectively selected by the researcher. According to Palinkas et al, this study would be identified as purposeful sampling. Purposeful sampling encompasses the identification and selection of information rich samples related to the phenomenon of interest and is used widely for qualitative research (Palinkas et al, 2013). This makes purposeful sampling applicable for this study as certain firms and variables were selected to specifically measure developments along different points of the chemical industry value chain. The firms selected are representative of these different points and the variables selected offer a qualitative view of development.

#### *Data Collection*

The data collection method used in this exploratory case study is primarily archival retrieval of reports, developments, and graphs as well as messages from each firm's top management concerning the strategic management variables. Data will also be collected from several reliable and reputable sources and studies, specifically: MIT Sloan-Management Review, The World Economic Forum, The Boston Consulting Group, McKinsey & Company Consulting Group, *The New York Times*, *Wall Street Journal*, and *Forbes Magazine*.

#### **Justification of Case Study Firms**

Below is a brief justification of the chemical firms chosen for the three case studies. This will include why the firm is representative of the chemical industry and where the firm falls along the chemical industry value chain.

#### *DowDuPont (Commodity Chemicals)*

Within the chemical industry value chain, DowDuPont acts as a massive global conglomerate within the industry, representing the commodity chemicals sector. Commodity chemical firms produce bulk quantities of largely standardized chemical products with similar to

exact compositional matches. These products are typically sold to other production firms for use rather than directly to consumers. DowDuPont is currently the largest chemical conglomerate in the world, generating \$86 billion in sales in 2018 (Root, 2019). Before 2017, DowDuPont existed as two separate companies Dow Chemical Company and DuPont de Nemours Inc. In 2017, the two firms combined in a merger that was valued at \$130 billion (France-Presse, 2015). For the purpose of this study, data collected before 2017 (2000 and 2010) will be from Dow and DuPont separately as each acted as a commodity chemical firm within the value chain sector. The final data point for this study (2021) will see the combined variables of the merged companies collected.

#### *Eastman* (Specialty Chemicals)

Within the chemical industry value chain, Eastman Chemical Company acts as a mid-sized global firm within the industry, representing the specialty chemicals sector. Specialty chemical firms take the products from the commodity sector of the value chain and create high-value chemicals including performance chemicals, industrial chemicals, agricultural chemicals, and pharmaceuticals (“What Is”). Unlike commodity chemical firms which typically sell their products to the industry, specialty firms can either sell to industry buyers or direct to consumers, although selling to the industry is still more common. Under this definition, Eastman falls into the specialty chemical sector producing performance and industrial chemical products largely in the form of polymers, fibers, and plastics used in the production of labels, paints, adhesives, textiles, etc (“Kingsport”). These factors differentiate Eastman from DowDuPont on the chemical industry value chain. Eastman is considered a mid-sized chemical firm, with revenues and market shares dwarfed by the other two firms represented. However, since the researcher grew up in close proximity to the firm itself and Eastman employees, the firm was chosen

because of ease of access to information and resources for the researcher. While categorized as a mid-sized firm, Eastman Chemical is still representative of the specialty chemicals market bringing in 10.48 billion dollars in revenue in 2021 and recognized as a Fortune 500 company (“Eastman”). The strategic management measurables will be collected for Eastman Chemical Co. as the specialty chemicals firm representative.

#### *Procter & Gamble (Consumer Products)*

Within the chemical industry value chain, Procter & Gamble as a large, global, consumer goods firm within the industry, represents the consumer products sector. The consumer products segment of the chemical industry is the segment of the value chain that sells products directly to consumers. These products can include things like cleaners, detergents, cosmetics, and toiletries among other things. Procter & Gamble, similar to DowDuPont, is a massive conglomerate comprised of many household brands like Crest, Tide, CoverGirl, and Pampers. The products and brands that are developed by Procter & Gamble are sold directly to consumers, making the firm representative of the consumer products value chain segment. Additionally, at the end of 2021, Procter & Gamble had a market share of 9.86%, second only to Johnson & Johnson at 11.5% (“Procter”). As an industry leader in the consumer products segment, P&G is representative of this segment and the strategic management variables for Procter & Gamble will be measured for this study.

#### **Justification of Strategic Management Variables**

Below is a brief justification of the strategic management measurables chosen for each case study and why they are representative of the sustainability development enacted by each firm.

### *Corporate Vision, Mission, and Goals*

According to Stead & Stead, a corporation's vision' is, "a shared image painted in words that portrays the ideal future of the firm (Stead & Stead, 2008). This statement, along with the mission typically comes from the firm's top management structure and trickles down through the rest of the firm. While the corporate vision and mission will often include the company's stance on sustainability, this measurable can often be taken to the next level if the firm has a sustainability department with its own vision and mission. The goals of both the corporation and the company's sustainability department will often be included in these statements. The development by top management of each of the three firms' sustainability vision, mission, goals and organizational structure will be the focus of this study.

### *Sustainability Structure*

The inclusion of a sustainability department with its own vision, mission, and goals represents top management's modification of the firm's organizational structure to include sustainability. Beyond a sustainability department, the sustainability structure can also include projects or taskforces designed to uphold the vision, mission, and goals of the corporation. Given the longitudinal nature of this study, the development of these structures will be a measurable way to see if any of the three firms have implemented their vision, mission, and goals into the organizational structures of the firm.

### *Product Offerings*

Similar to sustainability structures, how have each of the three firms taken their developed vision, mission, and goals and turned these ideas into tangible products which from development to waste are sustainable in nature. Have the firms taken steps to produce new and innovative products which are better for the consumer and for the world? The measurement of

changes in the firm's sustainable product offerings will be considered as evidence of changes in the firm's strategic management processes.

### *Supply Chain Management*

Supply chain management primarily deals with the upstream supply operations and downstream distribution of the firm's products. Is the firm's supply chain management operating in a way that is sustainable and ethical to workers? This includes the acquisition of raw materials, production, delivery, and waste disposal. Often the supply chain management policy can be found in corporation's annual report which is where it will be measured for this study.

### *Reporting*

It now feels commonplace for a firm to provide an annual sustainability report for shareholders. However, this type of reporting has not always been accessible or even done by corporations. How has the sustainability reporting changed over the course of the study and is there an obvious appeal to shareholders to talk about the strides the company has made towards strategic management operations within the firm? The growth and development of sustainability reporting to stakeholders of the three firms will be measured over the three time periods.

### *External Recognition*

While external recognition is the least intrinsic of the six variables, it is an external measure of the success of the sustainability performance of the firm. The external recognition measurable will act as a success indicator of the previous five measurables. Through the identification of external recognition, it is easy to tell whether business peers or stakeholders themselves are taking notice of the sustainable operations and strategic management of our firms.

### **Data Analysis (Case Study Reports)**

Data will be analyzed using Yin's (2013) method for multiple case study analysis (Figure

2.). This allows each individual firm to be looked at on a singular basis in respect to their strategic management development. However, it allows the findings of each case study to be cross-referenced in order to draw cross-case conclusions and generate a hypothesis for the study.

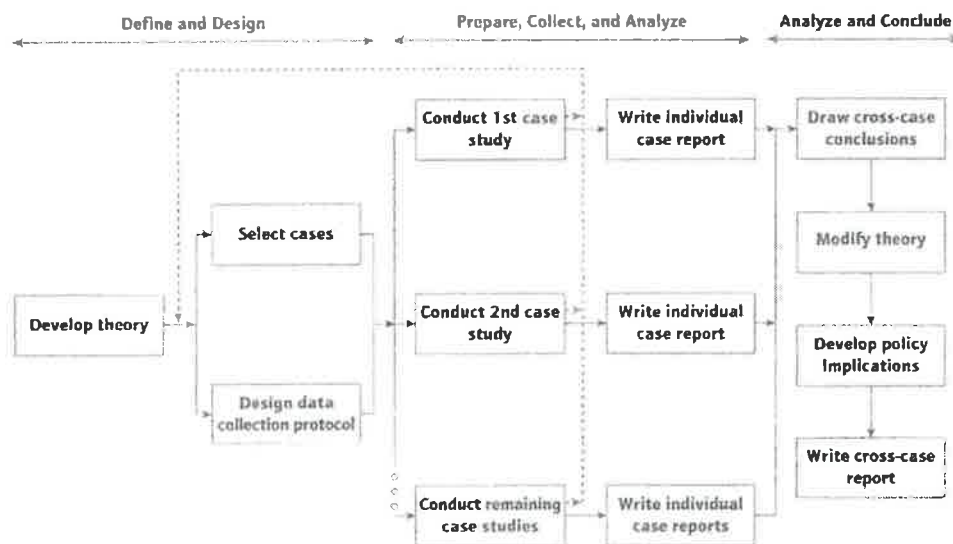


Figure 2

### DowDuPont 2000, 2010, 2021

DowDuPont Chemical Company, formerly Dow Chemical Company and DuPont de Nemours Incorporated, is the result of a 2017 merger between two of the largest commodity chemical firms in the world. As such, much like their market share, the firms have long been industry leaders in the efforts for sustainability within the chemical industry. In fact, Responsible Care® as an industry initiative was developed by Dow Canada, a subsidiary of Dow Chemical in 1985 as the chemical industry faced increasing public pressure to reform (Belanger et al, 2009). This is reflected in the fact that by 2000, Dow Chemical Company was the only one of the three firms observed to have a corporate vision, mission, and goals. The first of these came in the form of a 10-year plan in 1995. These goals included:

- Doing Less Bad
- Doing More with Less
- Energy Efficiency
- Eco-efficiency

With another set of goals coming in 2005 and 2015, the development in the 2005 goals is a tribute to the development of sustainable strategic management for the firm given just ten years of consumer pressure and environmental science. The 2005 goals include:

- Local Protection of Human Health and Environment
- Contributing to Community Success
- Product Safety Commitment
- Sustainable Chemistry
- Products Designed to Solve World Challenges
- Energy Efficiency and Conservation
- Addressing Climate Change (Graham).

Not only are these goals more numerous, but each one has a detailed explanation describing the objectives and functions the firm will use to achieve them. The 2015 Sustainability Report features Dr. Neil Hawkins, Corporate Vice President and Chief Sustainability Officer, highlighting how Dow achieved each of their 2005 goals and the journey toward the firm's 2025 goals ("Dow"). The 2015 Sustainability goals are best viewed direct from the 2015 Sustainability Report. The 2015 goals are grouped by five main categories, environment, energy, food, water, and operational excellence, each with its own initiatives and parameters to achieve. As the largest of the three firms observed, it makes sense that DowDuPont should be leading the charge when it comes to sustainability, and this is representative of the data and the early start the firm had in both internal reporting and their corporate vision, mission, and goals.

The 2025 sustainability goals for DowDuPont are further evidence of the firm's developing vision, mission, and goals and also highlights some of the other developed aspects of strategic management. Because DowDuPont has had such clear goals for the sustainability structures and product offerings, these strategic management areas are highly developed and



innovating by 2021. For example, all DowDuPont plants and factories operate within a 3:1 mitigation multiple, referencing the mitigation strategies the firm is taking to reduce waste and hazard to the environment and employees mitigates the risk with a success rate of 3 to 1, cementing the firm as a leader in energy and CO<sub>2</sub> footprint mitigation among multiple product lines (“Dow”). As of 2019, DowDuPont has also entered recyclable materials partnerships with Fuenix Ecology Group and UPM Biofuels to ensure their products are dealt with in a sustainable way upstream through their supply chain on the way to consumers. One of the most unique forms of sustainability innovation is DowDuPont’s partnership with Beyond Benign and several universities to fund and develop two higher education programs, The Green Chemistry Commitment and Toxicology for Chemists, which are both theorized and taught with green chemistry theory and practice in mind (Sheery). While this is not an example of one of the strategic management variables observed within this case study, it does highlight the impact innovation strategic management operations can have across disciplines and how firms can impact future scientists, researchers, managers, etc.

As an industry leader, the awards and external recognition for DowDuPont are too numerous to begin to list with multiple awards won and presented to the firm every year. One of the most impressive achievements for the firm is headlining the Dow Jones Sustainability Index each of the last sixteen years. The DJSI includes global sustainability leaders across a variety of disciplines as recognized by the S&P. This list is often used as a investment tool for investors looking to put their money into firms who operate in a sustainable and innovative way, something which was discussed in the Literature Review section as well. In addition to this impressive feat, DowDuPont has also won UPM and Raflatac Lifetime Sustainability Awards honoring firms who have met sustainability benchmarks and developed these into cross-



discipline and innovating methods for operation (“Dow”). DowDuPont is the story of an industry giant, who has led the way for sustainable management and who’s strategic management variables are evident and innovating.

## DowDuPont Chemical Company

DowDuPont Chemical Company	2000	2010	2021
Corporate Vision, Mission, & Goals	#	#	!
Sustainability Structures	O	#	!
Product Offerings	X	#	!
Supply Chain Management	#	#	!
Reporting	X	#	#
External Recognition	#	#	#
Consumer % for Sustainability	15-20%	35%	66%

- X- Not Found
- O- In Development
- #- Functioning
- !- Innovating

Figure 3.

Eastman 2000, 2010, 2021

In 1918, the end of World War 1 had caused a shortage of chemicals including methanol, acetic acid, and acetone which were used to produce consumer materials such as photographic paper, optical glass, and even gelatin. By 1920, the company, then known as Eastman Kodak, was established in Kingsport, Tennessee by founder George Eastman. Within the decades that followed, Eastman's portfolio of products and manufacturing processes continued to grow. By the late 1960s, Tennessee Eastman Company was producing scores of products that were quickly becoming staple products of everyday life. Furniture upholstery and clothing apparel were being produced with Eastman’s polyester fibers, plastics for the automobile industry, and an increasing number of industrial chemicals were serving a growing client base.

Led in 2000 by CEO Earnest Davenport Jr., the 2000 annual report holds very little in the way of any corporate vision, mission, and goals for sustainability. This is not unique to Eastman Chemical Company at the time. At this point, Eastman, as well as much of the chemical industry are adhering to performance initiatives and policies set forth by the Compliance and Responsible Care® program. While Responsible Care® was a vital part in the chemical industry's shift to environmental responsibility in the late 1980's and 1990's, it is evident that compliance with Responsible Care® was enough for the firm at this point in time. By 2010 and 2021, Eastman has radically changed their corporate vision, mission, and goals when it comes to sustainability. 2021 sees an entire Sustainability Report from the firm outlining the firm's vision relating to sustainability. This is in alignment with 2021 CEO, Mark Costa, and his commitment to managing a firm with strategies to innovate for a sustainable future, mitigate climate change, mainstream circularity, and care for society, all goals laid out in the 2021 sustainability report. These developments narrate the changing priorities of Eastman for both its corporate vision, mission, and goals as well as its internal reporting.

Product offerings and sustainability structures are another set of strategic management variables that often coincide with each other and which saw great development over the last 21 years for Eastman. As the producers of specialty chemicals, resins, polycarbonates, and other plastics, Eastman deals with a deliverables sector which is often cited as being one of the more dangerous environmentally in their disposal (Knoblauch, 2022). With this in mind, Eastman has progressed in both their product offerings and sustainability structures to operate sustainably within the industry and innovate for further developments. Where product offerings are concerned, over the three points in time studied Eastman developed co-polyester resin Tritan as one of their flagship products in 2007. This product proved incredibly popular for the firm and in

2021 Eastman will soon be launching Tritan Renew. Launching in 2022, Tritan Renew offers sustainability without compromise, providing the same durability, performance and safety of the original Tritan polycarbonate but now with up to 50% recycled content derived from waste plastic. In 2014, Eastman Omnia was released as a high-power industrial solvent cleaner with a revolutionary combination of high performance and human and environmental safety (Mantyla). These are just two of the products Eastman has released as part of their commitment to delivering more sustainable products to consumers. This is in addition of a recent investment into a \$250 million dollar plastic-to-plastic molecular recycling facility in an effort to eliminate their product waste from conception to disposal, this facility will enable the annual production of approximately 150-200 million metric tons of specialty polymer made with recycled content. Eastman will also be taking this technology in partnerships with many prominent brands including H&M, Patagonia, Estee Lauder, and LEGO to reduce their own plastic waste problems. This is a truly innovative way for Eastman to not only solve their own problems but empower other corporations to mitigate their own ecological footprint.

While external recognition is certainly the least intrinsic of the strategic measurement variables observed, it can still lend credibility to the work that a firm has put in for sustainability efforts. In the case of Eastman, they have long been garnered an industry award winner for sustainability, diversity, and inclusion. These include recently being named one of *The Wall Street Journal's* Most Sustainably Managed Companies, *Forbes* Best Employer for Diversity, as well as RE|FOCUS Sustainability Innovation Award to name a few. These awards seem even more impressive considering Eastman's place as a mid-sized firm within the chemical industry. Of the three firms pictured, Eastman seems to be the firm with the most evidence of development of their strategic management variables over the three points in time. As a mid-sized firm,

Eastman began the century operating safely and responsibly, over the last 21 years, Eastman has developed their sustainable operations and strategic management variables well above many of their mid-sized and larger peers within the special chemicals sector. This investment into their sustainable operations seems to be a true cultural facet of the firm, above and beyond any pressure from consumers or industry pressures.

Eastman Chemical Company			
Eastman Chemical Company	2000	2010	2021
Corporate Vision, Mission, & Goals	X	#	!
Sustainability Structures	O	#	!
Product Offerings	O	#	!
Supply Chain Management	X	#	!
Reporting	X	#	!
External Recognition	#	#	#
Consumer % for Sustainability	15-20%	35%	66%

- X- Not Found
- O- In Development
- #- Functioning
- !- Innovating

Figure 4.

#### Procter & Gamble 2000, 2010, 2021

Procter & Gamble is an international monolith operating along the consumer products sector of the chemical industry value chain. P&G is currently the second largest consumer products firm in the world, with a market share of 9.84% second only to Johnson & Johnson with a market share of 11.47% (“Procter”). The size of P&G puts them more along the lines of a DowDuPont than an Eastman Chemical, in regards to firm size within their respective sectors. Similar to DowDuPont, Procter & Gamble displays evidence of sustainable operation even at the beginning.

As a large-scale industry leader, one might expect the same level of evidence, development, and innovation from Procter & Gamble as was evident from DowDuPont. This is mostly true when looking at the sustainability report from the firm for the year 2000. While Procter & Gamble does have a corporate vision for sustainability, there is no evidence of future goals the firm has vocalized for further development. In fact, much of the 2000 Sustainability Report deals with the history of the firm, “doing historical good” and the new vision the firm has for sustainability surfacing in 1999 (Lafley, 2000). However, the inclusion of a distinctive sustainability report in 2000 is still evidence of strategic management variable operation, even if it was not as forward-thinking as DowDuPont’s. By 2010, this has changed, like DowDuPont and Eastman, Procter & Gamble has extensive sustainability reports for both 2010 and 2021. Each report is filled with achievements, missions, and goals the firm has for the immediate and long-term futures. Both in the 2010 and 2021 Sustainability Reports, goals are categorized into groups for products, operations, social responsibility, employees, and stakeholders (McDonald, 2010). Among these goals, many of them have to do with the ethical and sustainable disposal of their product packaging, which makes sense given the high volume of waste Procter & Gamble’s products create. Water conservation is another one of P&G’s main goals of sustainability, since 2010 they have restored over 3 billion liters of water to people and nature while also increasing water efficiency in operations by 25% per unit of production and sourced 3.1 billion liters from circular sources (Taylor, 2021). This level of sustainable organization puts Procter & Gamble on the same playing field as DowDuPont and Eastman when it comes to sustainable evidence and development.

While there was not as much development for Procter & Gamble from 2000 to 2010, since then the firm has done an excellent job with their sustainability structures reducing

emissions from global operations by over 50% since 2010 (“Environmental,” 2021). In regards to emissions, all three firms have structured plans to decrease carbon and greenhouse gas emissions, with all three firms resolving to be entirely carbon neutral by 2050. However, Procter & Gamble is even more ambitious in this objective with a goal of 2040 (“Climate,” 2021). As a firm that uses a lot of plastic packaging for products, it is a priority of P&G to offer product packaging options to consumers which are environmentally stable and easily recyclable. In 2021 alone, P&G recycled 780,000 metric tons of plastic packaging and used it to create 70,100 metric tons of recycled plastic resin to be reused back into their products and packaging (“Product Packaging,” 2021). Up to 9% of the recycled resin was recycled again to be brought back into the circular vision P&G has for its product packaging. Similar to DowDuPont and Eastman, Procter & Gamble has several beneficial and innovative partnerships to create innovative operations for sustainability such as The Alliance to End Plastic Waste and the BioPlastics Feedstock Alliance, both are investments and partnerships Procter & Gamble have entered into to make sure environmental plastic leakage and the ethical sourcing of plastics are carried out (“Partnerships and Programs,” 2021).

Interestingly enough, Procter & Gamble received a Packaging Innovation Award from DowDuPont in 2019 (“Awards and Recognition,” 2021). This displays the respect and recognition the management of these firms often have for each other in regards to sustainable development. In addition to this, as many of P&G’s sustainability goals deal with water, in 2016 they were given the American Forest and Paper Association’s Sustainability Award for Water proving the benefits of outlining clear goals for sustainable efforts and the rewards that can come from goals. Like the other two firms, the list of P&G’s sustainability awards is too numerous to list, but it is important to highlight key aspects of sustainable development and the benefits that



can come from operating in a sustainable and innovative fashion.

The Procter & Gamble Company			
The Procter & Gamble Company	2000	2010	2021
Corporate Vision, Mission, & Goals	X	#	#
Sustainability Structures	X	O	#
Product Offerings	X	O	!
Supply Chain Management	X	#	#
Reporting	X	#	#
External Recognition	X	#	#
Consumer & for Sustainability	15-20%	35%	66%

- X- Not Found
- O- In Development
- #- Functioning
- !- Innovating

Figure 5.

### *Research Matrix*

The research matrix (Figure 3) constructed is in alignment with Yin's method for multiple case study analysis. While Yin's method primarily deals with the analysis of the data collected, the research matrix handles the organization and analysis of the data collected which was used to write case study reports. As mentioned in the data collection section of this chapter, data was collected from a variety of archival sources. This data was then categorized by firm and organized by the different sustainability measurables of each firm and the year in which it was collected or developed. This allowed the data to be organized and placed into the respective case study for each firm.

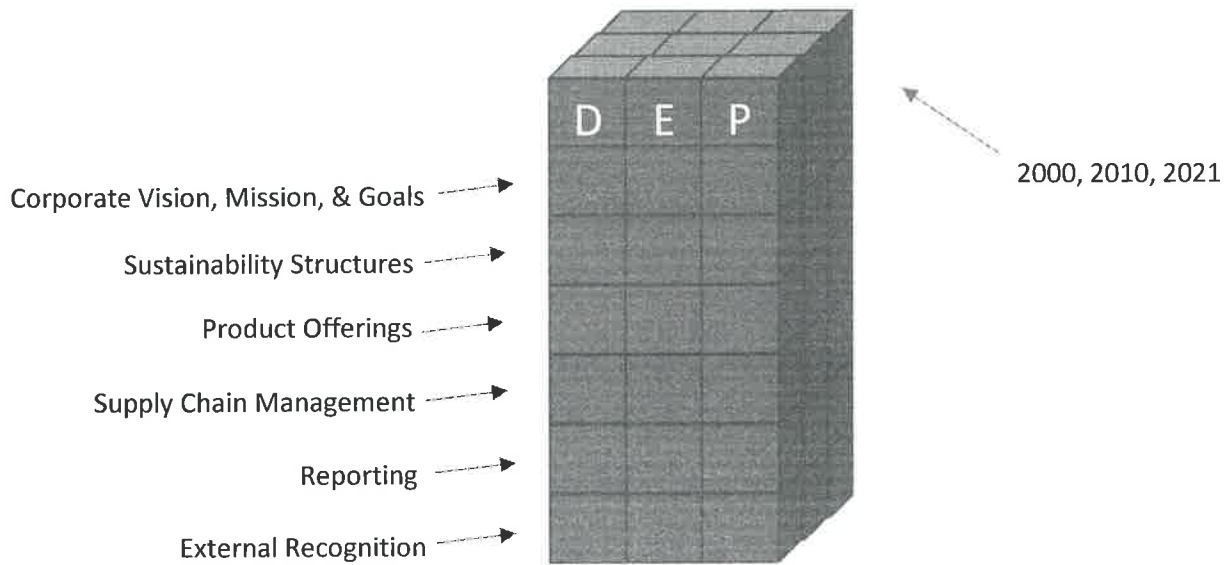


Figure 6.

### *Methodological Limitations*

As mentioned in the Introduction chapter, the primary methodological limitations of this research involve the qualitative analysis of the three firms. As such, there will be no quantitative conclusions drawn from the research, but hypotheses will be generated from the observational nature of the study. With that said, the methodological practices used in the analysis of the three firm case studies and in the designing of the research matrix seek to minimize the effects of the methodological limitations to ensure plausible hypotheses.

## **CHAPTER 4**

### **CONCLUSION**

There are three primary hypotheses drawn from this qualitative research study. The hypotheses generated follows:

Hypothesis 1: As consumer pressures for sustainability increases, there will be an increase in the development of sustainable strategic management practices as measured by changes in mission, vision, goals, organizational structure, culture, and product mix.



This hypothesis is evidenced by the linear progression found in the case studies of all the strategic management variables noted since the year 2000. Including that the development of strategic management variables by the case study firms, are due in large part to the shifts in consumer preference since the beginning of the environmental movement in the 1960's. Once again, this is evidenced by not only the development of strategic management variables within the case study firms, but also the trends in consumer behavior and wants noted in the Literature Review. Finally, the sustainability practices and strategic management operations of the three firms studied seems to go above and beyond development for financial gain and competitive advantage. Based on the findings of these case studies as well as the obvious increase in consumer demands for sustainable practices and products, the greatest takeaway from this research is that from a consumer standpoint, the cultures of these firms have changed and affected their stances on the environment, social justice, and especially the decisions the firms make to create money, opportunity, and business for themselves. The demand for these sustainable products and practices have transformed the chemical industry from an industry of environmental compliance to innovation and responsibility.

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