An Analysis of Neuromarketing: Methods of Use and the Future

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Chapter One: Introduction and Thesis

Introduction

There is a notion of common sense tied to the business world. It's an industry, at its core, built off relationships and communication. Handshakes are laced with mergers between companies. Contracts condemn employees with their cleverly placed fine print. Signs spring up across retail stores that capture a consumer's attention with bold, bright lettering, and promising pricing. While the business world can be reduced to its simplistic bones, there are much deeper layers to the realm that, truthfully, surrounds us. Our understanding of how products are marketed to consumers and the psychological effects of these tactics are critical to our purchasing process.

There have consistently been streams of new ways to market products to buyers. With the expansion of technology and tracking, retailers have access to our habits and traits. Our wants and needs are constantly being tracked at a macro level. This notion has been heavily normalized in society. To some degree, it could be argued that it is beneficial to the average buyer. Software that can help you narrow down or pick a specific product is useful when it knows you well enough. However, it's become much more than standard internet cookies.

The goal of marketing is to gain traction with consumers, and circulating interest within a community or target audience is important. There are different approaches a company or brand might take to push their product or service but there is something deeply psychologically tied to marketing. There are emotional and physical responses attached to everything from colors, font, slogans, presentation, etc. These are all important factors that need to be well thought out in the process of pushing a marketing campaign. While we are continually being tracked at a macro level, we can be studied at a micro level. Thus, offering explanation and support to how we

follow through with our purchases and *why*. Likewise, we can find additional methods to find out more about our consumers and they react to specific marketing processes.

In the process of research, there has been a heavy emphasis on a new notion called "neuromarketing" or "consumer neuroscience". This is a relatively new concept, introduced in the early 2000s, that has seen persistent evolution. The purpose of neuroscience in a business setting is to understand the emotional responses of a consumer through a scientific lens. Its goal is to use neurological tactics to understand consumer behavior. This is something that could hold a heavy placeholder in the future of consumer behavior, however, there are a plethora of moving pieces in this new form of studying neuroscience that needs to be explored to properly reveal whether it is a valid tool for studying the average consumer.

Statement of the Problem

The study of consumer behavior classically deals with how and why consumers may or may not purchase a good or service. How can we uncover the best ways to market and promote products in the target market? Nowadays, there is a heavy saturation in many markets, the options feel endless. When businesses use neuroscience to research the responses to their products and marketing plans there are multiple things to consider. What is the process of neuromarketing and how is this different from what is traditionally used in the business world? Is the process of neuromarketing ethical for a producer to perform? Is the process something that can truly advance consumer behavior studies?

Neuromarketing combines neuroscience studies with consumer behavior. The process is meant to further develop the producers understanding of what works in a potential marketing plan or product and what doesn't. Typical neuromarketing research will consist of eye tracking, EEG and FMRI, facial coding, sensory marketing, and other psychological tricks (Devaru,

2018). Each of these is a method to investigate a consumer's brain, literally. Neuroscientists look at which parts of the brain are most active when watching a television ad, for example. This method is called FMRI (Mirsha, Shukla 2020). Each of these methods allows for immediate feedback from consumers which in turn, assists a company in the process of building a stronger brand.

Certain ethical boundaries may be crossed in the process of utilizing neuroscience to uncover more about consumer behavior. When using FMRI, there can be an unknown biased reaction to marketing signals (Clark, 2020) An example from a study conducted by Harvard University shows how the brain can be deceived into thinking there might be a reward when presented with something it is familiar with. The study plays a comedic cartoon's introductory theme song for a group of fans, familiar viewers, and people who have never seen the show before. The results showed that those who were fans of the show had activity in the part of their brain that thinks there is to be a reward (The Neurological Effects of South Park, 2016). This is just one part of the puzzle when it comes to combating the ethical issues aligned with the neuromarketing processes.

Traditional means of marketing are becoming outdated as society becomes both overly stimulated and desensitized. Using neuroscience methods to interpret the emotional and physical response to an ad can be enlightening for a brand. The smallest details in an ad or product can grant a company the upper hand. Its goal is to discover those subconscious behaviors that humans consistently lean into (Iloka, Onyeke, 2020). Consumers are faced with daily decisions even when they are not aware. It's incredibly progressive for companies to utilize neurological methods in their research of consumer behavior. The territory is heavily undiscovered, yet this

only promotes its usage. Its evolvement can significantly assist the growth of companies and how they produce.

Consumer behavior can be substantially expansive. Some elements are being undiscovered by modern marketers and neuroscientists. While there are problems attached to these new and interesting tactics, they allow producers to develop stronger methods of advertising. These studies that are being published about consumers are also very beneficial to the average consumer of any service, platform, or product. The tracking of a consumer's brain empowers the consumer to be educated on their behavior and be mindful of the schemes presented by the monetary world.

Background and Need

The reactions consumers subconsciously have to the world around them are critical. Not only to those who produce what they react to but also to the consumers themselves. It enhances our knowledge of something as complex as the human brain. The core question of "*why?*" can be heavy and bewildering. This is something that has driven nearly every scientific study, every curious brain, and anyone who wants to know *more*. Understanding the significance behind the reactions that we can't always see is transformative for the corporate world.

There's a lot that we can take away from a consumer, besides assisting in a marketing campaign for a company. Learning more about the psychological patterns that help us decide why we pull the trigger on a purchase, can help us learn more about human behavior in general. The truth is that there is not always much rationale behind buying behaviors. Loyalty can change and the markets are becoming increasingly competitive. Any event that occurs within the consumer experience is affected and can be disrupted or trigger the buyer.

Consumers make rapid decisions when they are shopping in a market. Studies show that a buyer's response to buy or not to buy is triggered first by an emotional reaction (Ramsoy, 2019). Tracking the emotional responses consumers have to products is key and can show patterns in the average consumer. We, as humans, can be very predictable and appreciate this in our media. A study conducted in 2014 showed a sample group in such a way that the study concluded that society has a movie sequence that can be heavily predictable based on pop culture trends and general media (ibid.). The deeper that we investigate phenomena such as this, the more we can gather from human and consumer behavior.

Purpose of the Study

The purpose of this study is to determine the importance of the implementation of neuroscience in the business world. Its goal is to provide an understanding of the processes involved and the significance of their development and evolution. How these might be used in a standard marketing plan and what place it has in the future of marketing and consumer behavior. The study will collect information from resources that demonstrate an understanding of neuromarketing to synthesize a conclusion. The results of the study will be used to inform both small businesses and corporations, specifically marketing teams.

Research Questions

Questions that will be answered within the study are as follows:

- *What is neuromarketing?*
- *What are the key elements used in the neuromarketing process?*
- *How does neuromarketing differ from traditional marketing?*
- *What are the risks and rewards for companies that choose to use this method?*

- *Is neuromarketing sustainable in the business world?*

Significance of the Field

Consumers are being faced with more choices than ever in the markets. There is constant variety and expansion from producers as subcategories continue to pop up with demand. Gaining an understanding of ways to promote a product better and make it stand out is a battle amongst companies but can be achieved. With the emergence of new methods, companies can utilize psychology to promote products and services at a personalized level.

Definitions

Definitions that are important to the basis of the study are described below:

- Neuromarketing: the application of neuroscience in terms of consumer behavior
- Consumer Behavior: the study of why or why not consumers might purchase items or services. It relates to how their overall attitude might influence a purchase.
- fMRI: (functional magnetic resonance imaging) is a process that shows activity in the brain using changes in blood flow, oxygen, etc.
- EEG: (electroencephalography) uses electrodes attached to the scalp to track neuron activity within the brain. It does not pinpoint the exact location of the activity in the brain.
- Eye-Tracking: used to track where eye movements travel to, and which portion of pictures or videos evoke the most reactions. Also tracks the dilation of the eyes in response to a stimulus to determine emotional arousal.
- Facial Coding: technology that is attached to the face to track facial movements when intaking products, ads, images, etc.

- GSR: (galvanic skin response) this method measures the electric conductance of the skin which includes measuring moisture levels from sweat.

Limitations

The limitations of this study will be that the subject is relatively new. As it is still expanding and being explored, it is constantly changing. To avoid outdated information, research will be conducted within the last five years.

Chapter 2: Literature Review

Introduction

Neuromarketing is an enhanced method of analyzing how producers can perfect marketing plans for consumers (Mishra & Shukla, 2020). Studying consumer behavior is a key factor in determining the most effective ways to market to a target market. Therefore, it's important to take a look at the research that focuses on a growing interest in and applications of neuromarketing. Many of these studies delve into methods such as eye tracking, facial coding, and FMRI (put in parentheses what this acronym stands for) that are used to break down the ways we can specifically pinpoint how to target consumers more effectively.

The literature review addresses three areas related to neuromarketing and consumer behavior process. The first section addresses the overall process of neuromarketing. It breaks down the methods used by neuromarketers and how the processes are effective methods in analyzing consumer reactions to ads and content provided by businesses. The second section investigates the way neuromarketing applies to the future of consumer behavior and what are the conditions and factors for its continued effectiveness. Neuromarketing can heavily influence business practices and provides a solution for how companies can increase their sales by adding depth to their marketing tactics. The third section provides the historical context for the evolution of neuromarketing and consumer neuroscience. It offers the rationale for the development of consumer neuroscience and the impact its creation has had.

Literature Review

Neuromarketing Processes

Neuromarketing is used in such a way that marketers can pinpoint how advertisements are delivered to the public. Using tools such as eye tracking, EEG, and fMRI (brain tracking), we can deduct what is needed or what was achieved (Alsharif et al., 2021). The primary neuromarketing tools are used to record metabolic and electric brain activity as well as non-brain activity. Each tool has a very specific purpose and one of the most useful tools involves studying the brain's response to the media put in front of the human as well as how our physical body responds externally. EEG (electroencephalography) is a tool that can measure the responses of neurons in the brain directly (Alsharif et al., 2021). Additionally, eye tracking is a tool that is used across many psychological fields such as behavioral psychology and cognitive psychology (Alsharif et al., 2021). It assists producers in accounting for the way that a consumer might react to something like packaging, the colors chosen for the product, and where the product is placed on the shelf or in the store (Alsharif et al., 2021). Components such as eye tracking can provide important insights to marketers looking for feedback on their ads but can also assist brands in their marketing and product packaging.

This literature review describes in detail the elements involved in neuromarketing and how they work. The research provides in-depth information about each tool and how it can be applied by neuromarketing and how they are classified. The limitation of this study is the absence of providing the strengths and weaknesses specifically for each tool.

A study about point-of-purchase marketing analyzed the way eye tracking is used in stores and how it plays a role in a consumer's shopping experience. This research cites findings from an earlier study conducted in 1975 and discusses the way consumers go through three stages when making purchasing decisions (Chandon et al., 2006). The three stages are orientation, evaluation, and verification. Each of these stages can be applied throughout the

consumer purchasing process. These researchers conducted a study that tracked the way that consumers made purchasing decisions for orange juice and laundry detergent. The consumers were all women aged twenty-four to sixty-five years old and they did the shopping for the household. The results showed how visuals played a large role in the purchasing process (Chandon et al., 2006). The way that consumers analyze products and select what they want is something that was noted and is key to growing profits for a business. When producers understand what consumers respond to and what they want, they can adapt to consumer wants and needs.

This literature review was a stepping stone into why eye tracking specifically is important to producers and how it affects consumers. The study was performed well, focusing on female eye tracking rather than male eye tracking as the females are the main shoppers in a traditional household. The purpose of the study was to collect data on eye-tracking and the way consumers use brand preferences during their shopping experiences.

Furthermore, exploring the factors that influence consumers in their decision-making process is also important. Tracking facial and brain activity is significant in the analysis of consumer behavior and how much information it shows (or reveals). For example, a simple pupil dilation indicates a response. When there is an emotional response, the pupils will not waver in their dilation (Harris et al., 2018). Additionally, EEG (electroencephalography) is a rapidly changing and high-tech way of tracking electrical neural changes in the cortex of the brain (Harris et al., 2018). These methods can track a consumer's nonconscious responses to the stimulus of an advertisement, product, or environment.

This literature review provides support for why these methods of neuromarketing are becoming widely used and covers their strengths and weaknesses. It includes information about

details such as heart regulation in response to a product or ad and whether that type of tool would benefit a producer in each category such as social media or brand strategy.

Neuromarketing Applications in the Future

Marketing is one of the key factors for any business. To succeed, you need your product or service to have exposure in a community for the target market. Neuromarketing can be used within many platforms. While there is a fine line or debate on whether neuromarketing is deemed a scientific study or a business application, it is very much clear that neuromarketing is of great assistance to the business world (Devaru et al., 2018). One of the most useful ways a business can hone neuromarketing techniques is within its advertisements. The way that consumers react to advertisements with their faces can be tracked with facial coding and eye tracking (Devaru et al., 2018). Commercials are a keyway to evoking emotion and creating an attachment to the brand. One study conducted an experiment in which, a test group was presented with samples of Coke and Pepsi and asked to differentiate the two. The participants were not able to separate the two sodas, but the scientists found that the group had increased blood flow as the group was triggered by the word "Coke". Simply knowing that they were being served Coke gave them a rush and the participants associated the beverage with something good or pleasant (Devaru et al., 2018).

This literature review gives us an overview of the strengths of neuromarketing and how it has been applied by businesses in the past. It also draws conclusions supporting the statement that neuromarketing is an effective marketing tool that should continue to be used in the business world. The review claims that “neuromarketing empowers marketers, psychologists, and economists,” (Devaru et al., 2018). It also suggests that the neuromarketing world will grow due to the competitive nature of the business world and the pursuit of the consumer.

The business world is ever-changing and has become incredibly enhanced and technological. Therefore, there's a need to keep up with the times and for businesses to explore in more depth the subconscious of consumers to discover why and how they behave as well as the way we discuss consumption. While neuromarketing tools may not be accessible to every company, it's critical that the business thoroughly understands its average consumer. Whether this is on a neural level or not, there is an urgency surrounding the competition in the business world. From a more general standpoint, the tools used in neuromarketing can assist companies with their marketing mix (Alvino, L. 2019). A marketing mix is composed of the "Four P's" or price, promotion, place, and product. Neurology can assist a business in analyzing its marketing mix by gauging a consumer's reaction to the P's. Using any of the methods that track a consumer's brain patterns, a business can monitor whether a consumer reacts positively or negatively to a price or the placement of the product on the shelf or the colors integrated into the product's packaging, etc. Another suggested application of neuromarketing mentioned in the study is to improve the understanding of the dynamics within a company. One such example is to assess trust within a team or a business deal (Alvino, L. 2019).

This literature review provides concrete suggestions as to how we might use neuromarketing in new ways in the future. While the technology is currently used for consumer behavior purposes, it can also be used in other areas within the company and between companies.

The History of Neuromarketing

Neuromarketing has made a huge breakthrough within the last ten years. The phenomena have taken the neurological, psychological, and consumer behavior world by storm. It's an

opportunity to combine the three and create a window into the mind of the average consumer. Neuromarketing is a study that takes traditional neuro strategies and applies them to studying consumer behavior (Iloka et al., 2020). Neuromarketing as a term was first coined in 2002 by Professor Ale Smidts and not long afterward came an influx of services that would harness this technology in the consultation industry. Neuromarketing has since taken off, developing a large following and extreme interest with more than three million search hits in 2018 (Iloka et al., 2020).

This literature review provided information regarding the background of neuromarketing and its progression through the years. While it may seem to be irrelevant or insignificant, since it is not a new area, we must understand the origin of this branch of consumer science. It's also necessary for us to grasp how much neuromarketing still has to offer now as well as its future applications

One of the first interests in neuromarketing came from the Coke/Pepsi study discussed earlier in the literature review. The experiment was conducted in 2004 and was looking to gauge the way consumers attached memories to products. This opened the door to more tests or experiments and applications and the world of consumer behavior was expanded (Plassmann et al., 2017). The same study found that when a consumer is presented with their favorite brand of something it triggered more activity within the ventromedial prefrontal cortex in the brain, which regulates emotions and memory. Another study conducted a test (or experiment) that showed that activity was raised in the NAcc or the nucleus accumbens when consumers were confronted with retail-like situations that required a yes or no response (Plassmann et al., 2020). This part of the brain regulates reward or the motivational process.

This literature review contributes most significantly by describing the original studies that motivated more investigation into neuromarketing. The main purpose of this research is to analyze the past, present, and future of neuromarketing in the business world.

Summary

Neuromarketing is a powerful tool that can and should be used within businesses to maximize profit and production, and ultimately benefit the consumer. When using neuromarketing methods such as eye-tracking, FMRI, and EEG, producers can deduce what is beneficial to their company and its consumers. Decisions are made constantly without consumers even processing that they are happening. Allowing consumers to voice their subconscious thoughts and emotions toward a product or service is important to the growth of a company. Producers need to take advantage of the technology that we are constantly developing to understand better consumer behavior and harness the power that consumers have when they respond to the stimulus placed in front of them. This includes things like advertisements, products, the way products are simulated in a store, etc.

Chapter 3: Methods

Introduction

Consumer behavior is what drives new and innovative methods of marketing and branding. The study of how consumers operate can be a mystery, but the idea that buyers are completely conscious while shopping has been ruptured. Decision-making is an important process to consider in the business world and can put a lot of pressure on producers. Within the last decade, there have been breakthroughs with modern technology and fields of study specific to the way the brain works in a retail setting. Neuromarketing has combined neuroscience with the values of the business world to put reason to why consumers purchase and behave the way they do. This relatively new method of studying consumer behavior is still being explored and has a wide scope of potential. Because of this, the following questions were addressed when performing research on the information and studies available:

- What are the key elements used in the neuromarketing process?
- How does neuromarketing differ from traditional marketing?
- Is neuromarketing sustainable in the business world?

Sample

To analyze any data recorded, surveys from research studies were gathered as the technology used is not something that can be obtained or replicated without expertise and funding. There are also in-depth reviews of the role neurology plays in consumer behavior based on the same journals studied. Both tools are dated within the last five years to the present year. The cutoff for research regarding the subject was 2016. Additionally, the majority of the findings are not based on neurological findings as the main focus is how the phenomena can benefit the business world and consumer behavior. Much of the content has been published within the last

three years. The earliest used piece dates back to 2006, however, this piece was not heavily used as its focus was outside of the research scope. Nevertheless, it did provide details on additional methods of neuromarketing that were outliers and considered to be interesting enough to delve into.

The research that is analyzed does not display any bias and rather assists the reader in understanding the benefits or harmful aspects of neuromarketing. The bulk of the research is also based on conceptualizing the idea of neuromarketing and utilizing it across the board in the business world to make marketing more efficient and productive for the consumer and producer.

The research that is collected mostly relies on working essays and peer-reviewed articles. The content of these all covers the basics of what neuromarketing is and what the methods consist of. Approximately of the articles contain research based on the study of neurology. These were not ignored, rather, they were not as closely analyzed due to limitations and lack of concentration. Again, the central idea of the research is to determine the validity of neuromarketing and its place in the business world.

Data Analysis

To analyze the data, the information about neuromarketing has been grouped and compared. The main limitation of neuromarketing is its recent departure into the academic world. The idea is relatively new hence, the limitations in broad sources and research. Despite this, the course of action taken when synthesizing the research is to categorize the current research. Research that confirms the validity of neuromarketing and its place in the world is noted and serves as a supporting source. Resources that argue that neuromarketing will not have lasting effects on the business world do not contribute, or claims neuromarketing does not have enough research to support my claims will be compared. Due to the youthfulness of the research,

conclusions must be gauged critically. If one article claims that the ideas behind neuromarketing are simply too futuristic or concentrated and other claims that the benefits of neuromarketing are plentiful and rewarding across the board, there will be natural conclusions drawn based on the article and the validity of the statements, authors, and overall subject matter. There is a consensus that will be concluded from the materials.

Summary

Conclusively, there is broadly a decade's worth of research being analyzed however, it is narrowly a demi-decade. The earliest article comes out in 2006 while the most recent article is dated 2021. Many of the materials studied are dated 2021 which is incredibly recent for research. This is a fast-moving industry that has a lot of basic information to sift through. The materials studied are being compared through their overall content and categorized into how they answer the research questions and how in-depth the information is that supports the claims that neurology studies are beneficial and an integral part of the modern business world.

Chapter 4: Results

Introduction

The way that the world processes information can be intense. Everyday society is forced to process stimuli from the world and the Internet. Technology exists that can track neural brain activity and exterior bodily responses to stimuli encountered by a subject, i.e. human. Specifically, in the business world, producers can track the brain activity of their consumers through electroencephalography (EEG) or functional magnetic resonance imaging (MRI) (Utriainen, 2020). The goal of neuromarketing is to gain access to the inner workings of consumer behavior that methods such as surveys, focus groups, and experiments cannot fully understand or explain (Stanton et al., 2017). We can use neurosciences to make discoveries regarding the subconscious behavior of consumers Some examples are fixed advertisements and product development details (color, size, shape, location, font, etc.).

Neuromarketing Methods

A variety of neuromarketing methods have been used over the past half-decade. These methods track neuro activity both within the brain and outside of the brain. The most notable methods that monitor the inner workings of the brain have been electroencephalography (EEG) and functional magnetic resonance imaging (fMRI). The most frequently used methods for monitoring outer neural brain activity or physical bodily responses are eye tracking (ET), facial coding, facial electromyography (FEMG), and skin responses (Ahmed et al., 2021). The difference between EEG and fMRI is that EEG detects electric brain activity whereas fMRI relies on reading metabolic brain activity (Ahmed et al., 2021). The fMRI measures brain activity by determining the amount of blood flow that enters the brain in response to a stimulus (Ahmed et al., 2021). While fMRI has been considered a widely popular and important tool in

conducting clinical and experimental studies, the EEG also has provided its fair share of contributions to the research world. It has gained in popularity partly because it is less expensive to use. The EEG uses futuristic-looking electrodes that are placed along the scalp of the subject to track the reactions of neurons in the brain (Ahmed et al., 2021). These neural responses occur in the cortex which will light up depending on the way the stimulus interacts with the subject. If the consumer finds pleasure in the advertisement or the product, researchers can expect the neurons to light up or become more active in response to the stimuli. The EEG provides a quick turnaround rate so that information can be interpreted within minutes (Devaru, 2018). This method is particularly beneficial for researchers looking to gauge the response to a stimulus such as a commercial. While the consumer is viewing the commercial, the researchers can establish which clips elicit the most neural responses (Devaru, 2018).

Non-brain activities can also provide, researchers with a lot of information which then can be used to determine the best methods of action when presenting an advertisement or crafting the packaging for a product. Eye tracking is a method that enables researchers to track the path of a consumer's eye when viewing a commercial, paper/digital advertisement, product, or social media outlet (Instagram/Facebook page). This method allows researchers working in the business world to track any subtle movements from the eyes as they trace over an image or video presented to them. Eye tracking is a highly tested method used in both marketing studies and psychological studies (Ahmed et al., 2021). Not only does this method track eye movements but also the pupil dilation and the fixation of the eye thus reading the emotional responses promoted by the stimulus presented to the subject (Ahmed et al., 2021). A study was conducted in 2021 investigating the response viewers have to GIFs (graphics interchange format) using eye tracking, face coding, and galvanic skin response (GSR). Galvanic skin response measures the

emotional arousal and sweat glands within sensitive areas like the hands and the feet (Ahmed et al., 2021). This study analyzed the extent of the emotion from each subject derived from the GIFs (Rúa-Hidalgo et al., 2021). The goal of the study was to understand how images are used in social media to illicit emotion and convey a specific message to the viewer. The researchers concluded that the methods used (ET, GSR, and facial coding) are notable and effective methods to analyze emotional responses to media (Rúa-Hidalgo et al., 2021).

The History of Neuromarketing

The use of neuromarketing has stemmed from the need to understand the consumer's mind throughout the purchasing process and experience. Furthermore, it is a means to predict how consumers might react to the stimuli within a retail setting (online and otherwise), through marketing and packaging, and the interactions in general. Consumers are constantly making subconscious decisions as they proceed through the purchasing process/experience, filtering the options presented to them. The mystery of why consumers behave the way they do has been an enigma (or puzzle) for the business world but neuroscience has provided a solution.

Neuromarketing has frequently been described as futuristic because of the methods used. The fMRI (functional magnetic resonance imaging) and EEG (electroencephalography) enable researchers to 'peek' into the mind and determine when and where there is an influx of activity in response to external stimuli. Although the EEG can see the rapid movements of neural brain activity, it cannot pinpoint exactly where the activity is coming from (Harrell, 2019). But the fMRI tracking compensates for the limitations of the EEG. Neuromarketing has had a handful of mentionable studies that enhance its reputation as an effective technique (or application). A study published in 2004 by Samuel McClure revealed the connection between a brand and neural

activity. The participants in the study were given Coke and Pepsi and were asked to taste them both. Two test groups were involved, one would drink anonymously and the other would know the brand before drinking the beverage (McClure et al., 2004). During, the sipping of the anonymous drinks, the participants would experience sudden flashes of a Coke or Pepsi can. Throughout the experiment, the researchers used fMRI to gauge neural activity. The findings showed that brain activity spiked when the participants in were presented with Coke rather than the Pepsi beverage (McClure et al., 2004). Not only did this indicate cultural preferences (Coke is a well-known and preferred brand), but it demonstrated the power neurological studies can have within the business world (McClure et al., 2004). The results of the study specifically stated that there was brain activity even when the flashing image of the can of Coke was presented to the participants. The use of the fMRI provided McClure and his team the ability to pinpoint the exact location of the sources of the greatest neural activity, and they concluded that it was most active in the dorsolateral prefrontal cortex (McClure et al., 2004). This part of the brain is responsible for memory (E. Sturm et al., 2016). Because of this connection, we can determine that the impact brands have on a consumer is a lot more complex than originally thought. A consumer's bias for a brand can heavily determine their likelihood of not purchasing another product (McClure., 2004).

The Future of Neuromarketing

Neuromarketing is an impactful technique that can be used to determine the way that advertisements affect the buying decisions of consumers (Ahmed et al., 2021). Neuromarketing is an ever-developing study that fosters discoveries and broader applications. Neurology has the power to positively foster non-invasive research on how to successfully market to a target market. Not only can it provide knowledge and insight for companies investigating their target

markets and gauging their responses to the company's products and content, but it can specifically assist start-up companies in identifying and understanding their target market. A start-up is a company that is in the first stages of operation, they are the 'newborn' of the business world. The majority of the problems that start-ups face are related to financing, and unfortunately often led to the start-up's demise (Girişken, 2020). A vital element to the success of a start-up is the ability to understand its target market. To do this, extensive research needs to be collected to ensure the success of their product and ultimately the company. Neuroscience research and techniques come into play as they have the power to motivate the investigation of target markets when proposing a new product, service, or marketing campaign (Girişken, 2020). While neuromarketing research cannot replace the traditional methods of market research (surveys, focus groups, consumer observations, and general consumer interviews), it can supplement or aid in the process of uncovering the wants and needs of the market (Girişken, 2020). The benefits of using neuromarketing tools such as eye-tracking, EEG, or facial coding for entrepreneurs and start-up companies are not to be ignored. Investing money into the technology needed to perform these methods would provide a return for their investment leading to the long-term success of the product and the company. The start-up would have the opportunity to expand and deepen its understanding of its consumers, i.e. its target market. Thus, the company could utilize more strategic and effective methods of marketing. Start-ups are popping up constantly and the marketplace can become heavily saturated with products that offer similar benefits or solve the same problem. The use of neuromarketing enables start-ups and other businesses to understand the conscious and sub-conscious needs of their consumers (Girişken, 2020). The intersection of neuroscience and marketing deepens the understanding of consumer behavior and presents solutions for businesses when crafting their marketing plans.

A study was analyzed to determine how neurosciences can assist start-up companies. The study evaluated the shopping experience of online buyers using EEG (Girişken, 2020). The goal was to understand what parts of the experience caused shoppers discomfort or caused negative emotions. The study noted that when shoppers could not locate the necessary buttons to add items to their cart or sort the products on the webpage, they experienced distress or negative emotions. The use of EEG enabled researchers to determine *when* consumers have negative feelings or emotions during the shopping experience. The U.S. Department of Commerce reported that E-commerce produced 251.7 billion dollars in the third quarter of the 2022 retail season (Statista, 2022). E-commerce (electric commerce) refers to services or products that are sold online (Fuscaldo, 2022). Sales for online stores rose by 49% in 2020 due to the COVID-19 pandemic (Brewster, 2022). Society has been shifting to become dependent on technology and web-based delivery for shopping experiences and marketing campaigns. The use of EEG, ET, and other neuroscience tactics contribute to the findings on the benefits as well as the negative impacts of marketing stimuli and products.

Conclusion

In conclusion, research shows that there is a significant amount of support for the use of neuromarketing within the business world. While there are limitations regarding the expensive price tag of technology to perform EEG, ET, fMRI, etc., there are incredible benefits for the company using these methods and applications. Neuromarketing has the power to alter the mindset of producers and refocus their marketing strategies. Through this technology, research shows that businesses are better able to determine what their consumers need or want, and what attracts them to their product or service. Businesses can examine the neural responses of their

target markets to advertisements, packaging, products, prices, and the way the consumers interact with their retail services.

Chapter 5: Discussion

Introduction

This thesis investigates the work surrounding neuromarketing and the studies that support its expansion through the business world. Neuromarketing is a relatively new phenomenon, only gaining traction within the past decade. The goal of the technology is to understand the consumer's mind and track their neural patterns while they make purchasing decisions. Researchers can do this through electroencephalography (EEG), facial coding, eye tracking (ET), functional magnetic resonance imaging (fMRI), galvanic skin response (GSR), etc. Each method can deliver different results, but the most used methods have been EEG and fMRI. The studies generally focus on the popular use of tracking brain activity through EEG and fMRI which have proved to be the most beneficial in terms of pinpointing where neural activity is coming from in the brain and what exactly it's responding to.

The design of the thesis was to investigate research and journals on the methods of neuroscience and analyze the way it can be implicated in the modern business world. Research on the subject focuses on the methods used in neuromarketing and the processes needed to perform the tasks. Some studies focus on putting the methods into action, such as the McClure study. However, much of the data collected is based upon in-depth research rather than true studies evaluating the effects of EEG, fMRI, GVS, ET, and facial coding. The research done reviews ways to improve the methods or how they can be used for future research.

The design of the research conducted for the thesis was broken down to cover three bases, the technology used in neuromarketing, the future of neuromarketing, and the history of neuromarketing. The focus was on understanding the nuances of neuromarketing and the long-

lasting positive and negative effects it might have on businesses. Understanding the processes that a company might have to go through to gain knowledge of the subconscious reactions evoked from market stimuli is a crucial element in comprehending the potential benefits for a business. Additionally, it adheres to the idea that neurosciences provide the necessary knowledge for businesses to excel in targeting their market segments and can greatly assist the traditional methods of marketing.

Discussion

Neuromarketing Process

Much of the research regarding the neuromarketing process discusses the way each method works and how it can be applied in a research setting. Integrating neuroscience into marketing and the business world is motivated by understanding the inner workings of a producer's average consumer. The benefits it can have if implicated in the modern business world can increase the productivity of the way we market and deliver products or services. EEG and fMRI devices have hefty price tags attached to them and would be intense investments for any company but can produce long-term benefits that can offer to reason as to when and where activity is coming from in reaction to stimuli. The technology to analyze the responses is non-invasive and is most suitable for acknowledging exactly when the brain experiences the most emotional responses. When used in conjunction with standard market analyst tools like surveys or interviews, more specific information can come through that a consumer might not recognize. For example, a viewer watching a commercial for their favorite beverage might have active neurons that are attached to the part of the brain that is in control of memory functions and stimulates emotions. They will attach the happiness they feel when drinking the beverage to the commercial. EEG and fMRI can be used to understand the emotional responses that are

subconscious to the consumer. This is important because businesses can harness these positive responses and replicate them through marketing plans, packaging, and overall brand image.

When producers take control of these technologies and invest in them, they can see benefits when tracking what works and what doesn't. Advertisements that have success are generally eye-catching and bring out emotions from the viewer. They can create a bond with their consumers. For example, brands that air commercials that have a high retention rate during the Super Bowl event are discussed long after their airing. They have this power because they fabricate an emotional bond with their consumer and general viewers.

The History of Neuromarketing

Because the idea of neuromarketing is relatively new, there is not a plethora of detailed data providing its usage. The methods neuroscience has subscribed to are not widely used across all companies. Little data is showing that the methods are as commonly used as they perhaps should be. The term neuromarketing was first developed in the early 2000s and has since received nearly twenty years of development and traction. It's important to understand the beginning of neuromarketing because of how it came from a place of need. Like many new inventions or methods of working, the goal is to solve a problem. In the consumer behavior realm, this will be a constant problem. Consumers react unpredictably at times, and this can hurt the market. Companies that are just entering the market are instrumental to economic growth and offer variety in a highly saturated market. However, they often fail due to the lack of concentrated and extensive research on their target market, product need, and pricing. When entrepreneurs introduce neuromarketing tools to their process of company development, they are more likely to experience success in their launch due to their concentration on market research. When using the tools like EEG, fMRI, ET, and facial coding, alongside traditional marketing

tools, the feedback is more distilled. There are limitations to classic methods of marketing research that can hinder a company's general growth. When researchers for a company explore the mind of a consumer, subconscious thoughts and reactions are revealed.

The Future of Neuromarketing

The future of neuromarketing lies in the hands of companies that choose to invest in its power and benefits. The technology can be used to understand the preferences of consumers and adapt the ability to predict their needs and wants. As stated previously, the benefits of this for a company and business research are huge. When we investigate the wants and needs of consumers, there is a deeper comprehension of what will produce more traffic and pull from the pockets of consumers. The neuromarketing techniques like EEG, ET, fMRI, and facial coding, can be used to analyze the responses to advertisements, product packaging, product usage, and customer service responses, and gauge the likelihood of purchase or engagement for a service or product. Neuromarketing has a long investigative future ahead of it but can transform the way producers deliver their media and products. It allows producers to have an internal edge on consumers that is scientifically proven and can easily be replicated because of its evidence against the consumer.

Limitations

The main weakness of this study is the lack of research that has been conducted on neuromarketing. There are a handful of sources that are used frequently in literature reviews and journals that can become repetitive and make the research pool feel much smaller. The idea of neuromarketing is currently about twenty years old and because of this, has not had extensive research due to its youth. Another limitation of the study is that it is concentrated on the business

benefits and neurological background knowledge is absent. This might have added an edge to the thesis in terms of conceptualizing the neuromarketing process.

Recommendations

In the future, it is recommended that researchers integrate studies into their study and apply this to previous knowledge. Any future study performed might also find interest in researching the responses from a variety of social groups. This might include social class or sexual preference (LGBTQ+). Focusing on these specific groups might harvest information concerning what marketing methods appeal to certain groups of people. Furthermore, during a month like Pride Month, researchers would be able to understand what those who identify as a part of the LGBTQ+ would respond to through ads or merchandising. If the research was centered on subcultures, the results might yield information that is much more specific and can benefit companies further in drawing profits from minority groups.

Conclusions

Three major conclusions can be made from this study. The first conclusion is that technology such as electroencephalography and functional magnetic resonance imaging is a highly specific method of tracking the way that the brain reacts and interprets the information that it is fed and a constructive method of evaluating the emotional responses of consumers. The second conclusion is that there is a great advantage to tying neurosciences and consumer behavior to marketing tactics. The third conclusion is that the research provided regarding neuromarketing is well-suited to make conclusions on the general benefits and predict its future accomplishments, but it does not supply enough data to allow companies to invest.

The evaluation of emotional responses to stimuli produced by businesses is important to assess because it provides scientific reasoning as to why consumers make their purchasing

decisions. When consumers are evaluated for their responses, companies can determine the impact their products, services, and advertisements have. Consumers have emotional connections to brands that cannot be ignored and beg the question of why. The powerful clinical technology that is used in traditional psychological studies can be harnessed and integrated into the business world to produce similar results.

The advantage that producers will have over consumers when harnessing this technology is important. To control the market and have the upper hand, producers need to understand their consumer base. When they have an understanding of what consumers respond to, and what they want and need, they can personalize their products or service. This process is key to creating profit and generating foot traffic for the business. Utilizing methods of neuromarketing helps producers manipulate their production of media, services, pricing, and product to fit the needs of the consumer.

Neuroscience is incredibly helpful in analyzing consumer behavior. Through the screening of the brain and the tracking of facial movements, producers can make predictions as to what works serves consumers and what does not. However, there is a strong need for more quantitative research rather than the qualitative research that was studied. It is a growing study that has received an 80% inflation in interest over the past years but still requires study. Without this persistence to learn and explore the uses and involvement of neuroscience in a business setting, the use of neuromarketing might die out. There must be a continuous sense of exploration from neuromarketers, consumer scientists, and business professionals.

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