

**Innovation Adoption:
Adopting change management techniques to
positively impact new product diffusion**

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Dedication

To my amazing husband, Richie. Your unwavering support and encouragement got me through the endless hours of work. Without having you by my side, this research would never have been possible. I am so blessed. Thank you!

Abstract

Several decades of innovation diffusion research has utilized varying lenses – from forecasting innovation diffusion to controllable variables such as cost, quality, and marketing. Yet with so much research into the affecting factors, innovation adoption continues to fail at an alarmingly high rate. One factor that could be influencing this failure rate is adopting an innovation requires a behavior change on the part of the consumer and the resistance to change may lead to the resistance to adopt an innovation. In this thesis, the effectiveness of applying change management techniques to promote innovation diffusion is investigated. It is shown that change management techniques used proactively in marketing can positively influence the overall diffusion of a working innovation. This unique research utilizes organizational change management techniques to promote diffusion and provides a pathway for doing so when dealing with diffusion in the market. Seven propositions were derived from combing consumer personality types and organizational change management. The propositions were challenged against successful and failed innovation adoption case studies for verification. Findings show that each of the seven propositions can positively influence innovation diffusion and as such, seven steps for innovation change management were identified as a pathway for managerial use.

Table of Contents

Acknowledgements.....	i
Dedication.....	ii
Abstract.....	iii
Table of Contents.....	iv
List of Tables.....	v
List of Figures.....	vi
1.0 Introduction.....	1
2.0 Literature Review.....	3
2.1 Innovation Adoption.....	3
2.1.1 Personalities and Buyer Psychology.....	7
2.2 Change Management.....	12
2.2.1 Change Management within an Organization.....	12
2.2.2 Personality and its Effect on Change Management.....	14
2.2.3 Norms and its Effect on Change Resistance.....	15
2.2.4 Personal Change.....	16
2.3 Summary.....	18
3.0 Research Questions and Methodology.....	20
3.1 Research Questions.....	20
3.2 Research Method.....	28
4.0 Case studies.....	30
4.1 Cases on the Social Networks.....	30
4.1.1 Background.....	30
4.1.2 Proposition Validation.....	31
4.2 Cases on the Adoption of Electric Vehicles.....	40
4.2.1 Background.....	40
4.2.2 Proposition Validation.....	41
4.3 Summary.....	48
5.0 Conclusions.....	53
Bibliography.....	55

List of Tables

Table		Page
1	Adopter Categories.....	3
2	Value Groups and their Motivations.....	9
3	Adopter Group Personality Traits.....	20
4	Combining Change Management Techniques with Innovation Diffusion.....	22
5	Case Studies that Verify the Propositions.....	51

List of Figures

Figure		Page
1	Adopter Curve.....	4
2	Adoption Performance S-Curve.....	4
3	When Adopter Categories Choose to Adopt.....	5
4	Adopter Growth Model.....	5
5	Adoption Stages and Influence Mechanisms.....	8
6	Innovation Population Segments.....	9
7	SEROC.....	15
8	Kubler-Ross Model.....	18
9	Proposition Locations along Adoption Curves.....	27
10	Member Timeline for Social Media with Propositions.....	49
11	Adopter Timeline for Electric Vehicles with Propositions.....	50

1.0 Introduction

The concept of innovation adoption is nothing new. Innovations make up a large percentage of companies' revenue and consequently if they fail, the entire company can fail as well [1]. As a company or innovator, it becomes very important to understand why innovation adoption can fail and how to proactively change failure to success. Since innovations fail at an alarmingly high rate, there has been a vast amount of research into what things can affect new product diffusion and innovation adoption. Everett Rogers tried to predict when someone would adopt a new product [2] while Frank M. Bass and other researchers [3-8] have tried to determine what factors influence how well an innovation can be disseminated into a market. For example, Bass tried to forecast how controllable variables, such as cost and product quality, can affect an innovation's overall diffusion. Many other researchers have explored other controllable variables as well [3-8]. However, there are other variables in product adoption that cannot be controlled. One such variable is the human psyche.

In regards to innovation, the human psyche is referred to as consumer psychology, and individuals such as Gladwell, Nejad, Sherrell, Babkus, Mansori, Sambasivan, Sidin, and Gourville have looked at how personality types can influence new product adoption [9-14]. Consumer psychology has shown how personal values of potential adopters, as well as other influential mechanisms, can impact an individual's decision to adopt something new [10-13]. Gourville also researched psychological switching costs and how the ratio of these sacrifices to benefits can sway innovation adoption decisions [14]. What this indicates is that for customers to adopt a new product or service, it requires a mental or behavioral change on the part of the consumer.

An individual's fear of change needs to be influenced in a skillful manner to get someone to buy, use, or do something new. Therefore, the use of change management techniques in innovation diffusion can be very helpful. There has been a lot of research into change management. However, most have looked at change management from an organizational perspective [15-17], from a social norm perspective [18, 19] and how personality types can affect positive change within an organization [20, 21]. No research or researcher has looked into creating a pathway to utilize change management techniques through understanding what they are and why, when, and how to apply them with innovation adoption knowledge in order to affect a new product's diffusion. This thesis investigates how using change management techniques can enhance

innovation adoption and provides a pathway for doing so. The pathway was adopted from change management context, but in this thesis, it is solely used for the purpose of innovation diffusion within the timeframe of a working innovation.

This thesis is organized as follows: Section 2 reviews literature in innovation adoption, adopter personalities, buyer psychology, change management within organizations, personality and its effect on change management, norms and its impact on change resistance, and personal change. Section 3 discusses research questions and how the propositions were derived, as well as the research methods used. With this, seven separate propositions are presented. Section 4 presents case studies to help verify the seven propositions. In this section, cases of social networking sites and electric vehicles were discussed in detail following the framework built by the propositions. Section 5 concludes the thesis and discusses the contributions, limitations, and future works.

Please note that in this thesis, the terms “innovation adoption,” “innovation diffusion,” and “(new) product adoption” are used interchangeably. Along with this, references to innovations or new products can also include new services.

2.0 Literature Review

Understanding consumer adoption is critical to understanding change predisposition and resistance tendencies. This includes looking at research into adopter types, innovation adoption diffusion, and buyer psychology. It is also critical to understand what has been done within the realm of change management to better understand these change predispositions and how they can be influenced. This includes researching change management from organizational and personal perspectives.

2.1 Innovation Adoption

Two individuals have been at the forefront of research into innovation and product diffusion. Everett Rogers and Frank M. Bass. Rogers [2] categorized adopters of any innovation into five groups: innovators (a.k.a lead users), early adopters, early majority, late majority, and laggards. Table 1 summarizes the different adopter categories that Rogers defined in the order in which they adopt a new product relative to each other, and the percentage of people within these adopter categories. Rogers had modeled this information in a bell-shaped curve and the model can be seen in Figure 1. Innovators are venturesome and are eager to try new ideas. Early adopters serve as role models for many other members of social systems because these members will look to early adopters to see if they have adopted a new product first. Early majority individuals adopt new ideas just before the average member of their social system and like to deliberate about adopting a new idea. Late majority individuals adopt new ideas just after the average member of their social system and do so out of economic necessity or pressure. Lastly, laggards are the last in a social system to adopt an innovation [2].

Adoption Order	Adopter Type	Percentage of the Population
1	Innovators	2.5%
2	Early Adopters	13.5%
3	Early Majority	34.0%
4	Late Majority	34.0%
5	Laggards	16.0%

Table 1 - Adopter Categories [2]

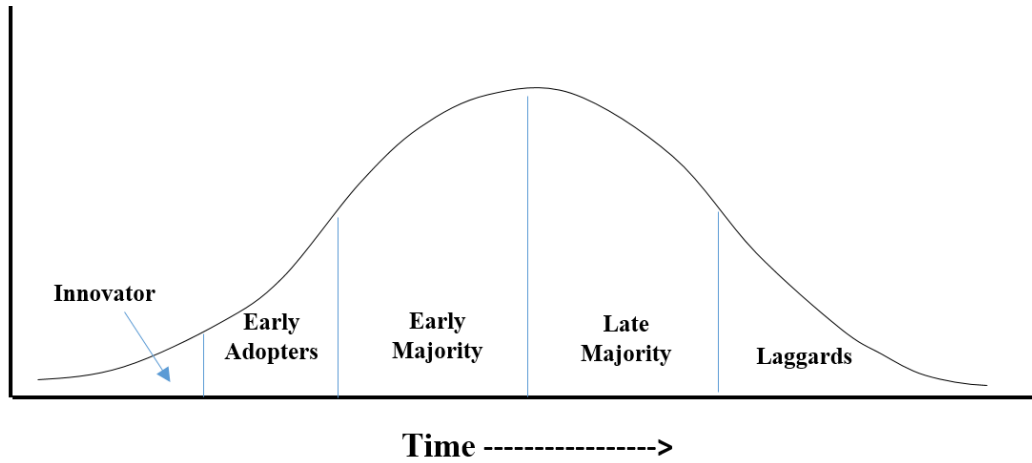


Figure 1 - Adopter Curve [2]

Rogers also modeled how the number of adopters is likely to increase over time. He was able to determine that every innovations' diffusion will take the shape of an s-curve because the innovation starts of stagnant, moves to a “take-off” period, matures, and then is eventually discontinued (Figure 2). This framework determines a new product’s performance in regards to time. As a result, it is important to know where an innovation is at any given time along that s-curve because it can have managerial implications [2]. Figure 3 indicates which adopter type adopts at which stages along the s-curve when Rogers’ models are overlaid.

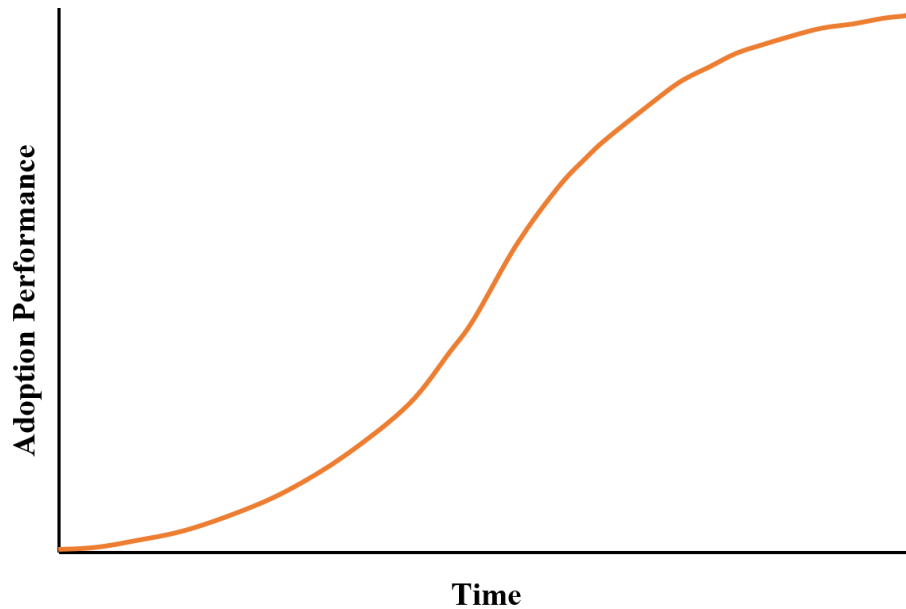


Figure 2 - Adoption Performance S-Curve [2]

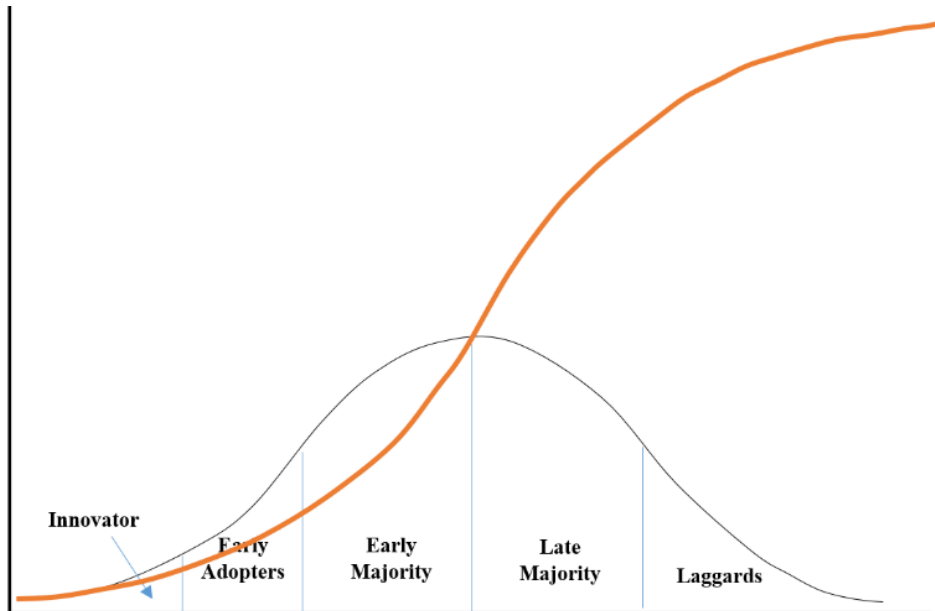


Figure 3 - When Adopter Categories Choose to Adopt [2]

Bass developed another model showing how the timing of an adopter's new product purchase is dependent upon the number of previous adopters and subsequent sales. He noted that in this model, sales would increase exponentially until they peak, after which sales exponentially decay. This is shown in Figure 4.

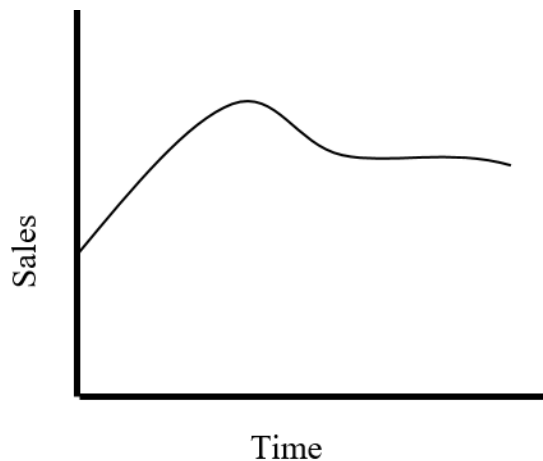


Figure 4 - Adopter Growth Model [3]

Bass also noted that the first group of adopters of a new product become aware of a product through their own devices and decide to adopt a new product without outside influence. The next

group of adopters, called imitators, adopt the product after they come into contact with one of the initial adopters [3].

Since Rogers and Bass, there has been further work that expands upon their ideas because research in innovation adoption has helped innovations succeed. This is important because an innovation adoption directly affects a firm's success [4-8]. On average, existing products make up approximately 28% of a firm's annual sales and profits [10] while a new product creates upwards of 40 - 50% of revenue and profits within the first five years of the product's existence [11]. However, even armed with this knowledge, approximately 41% of innovations that are brought to the market fail [11].

In both of the Rodgers and Bass models, there is an assumption that changes in cost and product quality does not affect the number of adoptions and subsequently, the diffusion rate. However, evidence has shown that such things do affect adoption rates [6]. A customer will not buy a product if the selling price is higher than the maximum reservation price. A reservation price is the most a consumer is willing to pay for a new product. If the cost to customers is lower than the reservation price, potential customers turn into buyers. Companies have done this type of research into reservation prices for their innovations. For example, Bass, Gordon, Ferguson, and Githens forecasted the maximum reservation price for DirecTV equipment prior to the product launch [7]. It was identified to be an average of \$700. This reservation price was determined by obtaining customer input through conversations and surveys of customers who indicated they would be interested in becoming subscribers. From here, researchers developed a plan to determine what the optimal programming combination needed to be and at what price the monthly fee should be set [7]. Doing all of this research to try and obtain a satisfactory reservation price may be in vain, however, as a customer's willingness to pay may change over time. Also, this reservation price can be influenced by other consumers [6].

Reservation price is not the only thing companies should consider to help promote adoption of their innovations. Especially with new communication technologies, the more a product is adopted, the more it increases its distribution. Referred to as an interconnectivity phenomenon, there are three factors involved in creating this. These factors are social comparison, network structure of interpersonal communications, and prestige seeking individuals. By understanding these elements to the interconnectivity in diffusion, it can accelerate rates of diffusion [22]. Along with this, understanding how certain adopter personalities types and buyer psychology influences

diffusions of innovations is equally as important because they too can affect diffusion rates. The following section discusses these concepts in detail.

2.1.1 Personalities and Buyer Psychology

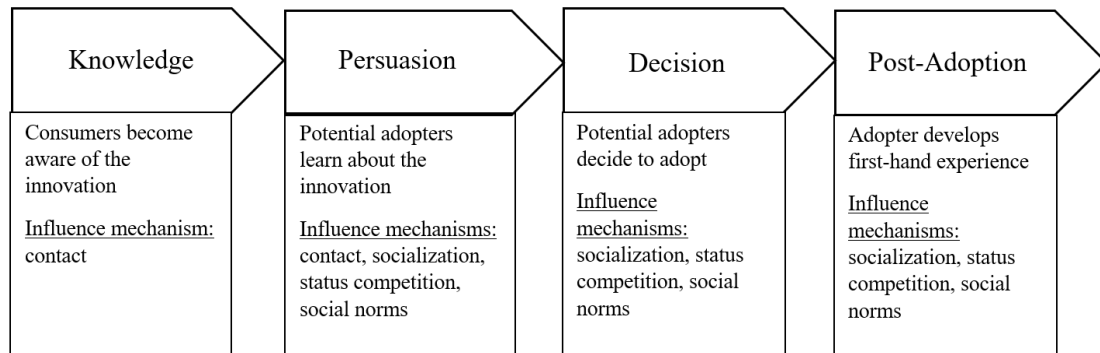
Certain personality types can drive diffusions of innovations. Gladwell explains these personalities and diagnoses why and how an epidemic in the diffusion of innovations occurs [9]. Epidemics have tipping points where the product or idea goes from a few persons to large quantities of people. To start this epidemic, utilizing certain personality types can be more effective than others. These people are referred to in the Law of the Few [9]. They are super social, energetic, knowledgeable, and influential. Through their social connections, energy, enthusiasm, and personality, spread the word and knowledge about innovations. There are three different types of “few:” connectors, mavens, and salespeople. All of these personalities are important to have when trying to diffuse a product into the marketplace successfully. Descriptions of these personality types are as follows [9]:

- Connectors are some of the most social people in existence. They have a large circle in which they communicate. These people help to promote an epidemic by being able to inform a vast amount of people about an idea or change. This knowledge of who to contact helps to push change forward.
- Mavens are people who have an extreme amount of knowledge on pricing, the best place to stay, where to find the best food, etc. and genuinely care about informing people about these things and places. Because Mavens have a genuine interest in helping people, they promote word-of-mouth advertising techniques that help innovation diffusion.
- Salespeople are just that. They are very good at understanding how to persuade people of all personality types. This is very important in innovation adoption as many individuals have to be persuaded to buy into something new.

Even though previous research has supported the thought that influential people play a large part in diffusion [9, 23], there has also been research taking the exact opposite view [24]. Diffusion research has mainly focused on word of mouth (WOM) techniques (i.e., contact) from influentials, and other mechanisms for diffusion such as socialization, status competition, and social norms [10]. These mechanisms move an adopter from not knowing about a new product all the way through post adoption experiences. Contact plays an essential role in creating awareness during the knowledge stage of an innovation adoption decision processes. This contact, or socialization, occurs when there has been a large number of early majority adopters that have

adopted new products, and other consumers rely on feedback from these early adopters before they make an innovation adoption decision [10]. Status competition is likely to happen when consumers compete for elite social status within whichever social group a consumer is a part of. While high “status” consumers will actively seek to maintain this status by adopting the newest technologies [10]. Lastly, social identity theory (i.e. social norms), argues that feeling like part of a member of a group is the primary concern to individuals because it helps determine their social identity [10]. All of these mechanisms are the means through which innovations reach potential adopters and contribute to the diffusion of innovations. Regardless of the innovation diffusion media used, the decision process for adopting innovations has four stages (knowledge, persuasion, decision, and post-adoption) and can be seen in Figure 5 [10].

Figure 5 - Adoptions Stages and Influence Mechanisms [10]



To take this another step farther, the decisions to adopt or not adopt can be broken down into population segments that are either unaware or aware of a new product. The adopters pass through these stages as called out in Figure 6. This is done by word of mouth and advertising techniques [25].

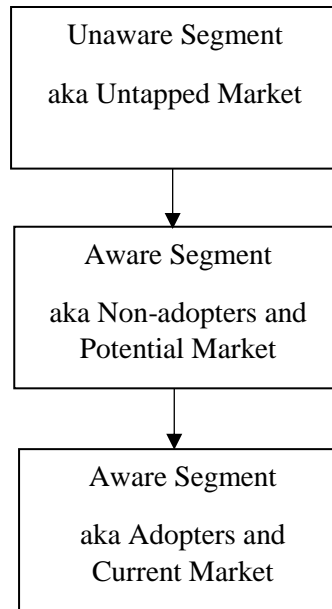


Figure 6 - Innovation Population Segments from [25]

Whether an individual will move from the aware stage of a new product to become an adopter depends on personal factors. For example, religion and ethnicity can create values within an individual which all influence adoption decisions [11]. The human basic value theory developed by S.H. Schwartz [12] discussed ten essential types of values that can motivate an individual's behavior towards innovation adoption because values dictate a consumer's change disposition. These values are self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism [12]. The values can further be categorized into four different groups of psychological characteristics and can be used to predict if someone will or will not adopt a new product. These groups are openness to change, self-enhancement, conservatism, and self-transcendence. Table 2 shows these four groups with associated values.

Value Groups	Motivating Values
Openness to change	Self-direction Stimulation Hedonism
Self-enhancement	Achievement Power
Conservatism	Tradition Conformity Security
Self-transcendence	Universalism Benevolence

Table 2 - Value Groups and Their Motivations [12]

The first group (openness to change) consists of individuals who usually do not resist new things and do not have difficulties adapting to change. The second value group category is “self-enhancement”. This group uses a type of motivation that drives individuals to feel good about themselves to maintain self-esteem. In regards to adopting products, these are the individuals who think that their self-worth is tied to being the first people to adopt a new product to maintain an image with their peers. As a result, the motivating values associated with this group are achievement and power. The third value group is conservatism where individuals in this group are committed to keeping traditions and are in direct opposition to change or innovations. They are motivated by tradition, conformity, and security. The fourth value group is self-transcendence. Individuals in this group do not limit themselves to being motivated by his/her self, but rather something “bigger” such as a higher power. The two value motivators for them are universalism and benevolence [11, 12].

Regardless of how values contribute to an individual’s adoption decision, adoption requires change on the part of the adopter. It is important to note that the change dispositions like those mentioned above by Schwartz can also be found within each type of adopter as discussed by Rogers. The change disposition values and traits that makeup innovators, early adopters, early majority, late majority, and laggards are what places them into these categories because people who are open to trying new things (like a new product) are more likely to embrace change [20]. Those people who hate change will be the laggards, where early adopters are more inclined to be okay with change [2]. Therefore, it becomes increasingly difficult for innovation to diffuse deep into the market because individual’s change resistance predispositions also increase.

Gourville researched the change resistance predisposition [14]. He states that there is usually an irrational overvalue of benefits that an established product provides and an underestimation of the benefits of a new alternative [14]. In order for a new product to be adopted, there has to be a positive psychological switching cost between this new product’s gains and losses. The innovation will stand a chance of being adopted if the psychological benefits are greater than the cost. Otherwise, the product diffusion is more likely to fail than be successful [14].

LaFreniere researched how using positive “feeling” advertising techniques led to an increase in adopters. She found that by spending twice what she would usually spend on advertising for her company coupled with having the primary focus be all on advantages, it created a sense of urgency with the potential buyer [26].

“This created and promotes a sense of urgency within a potential buyer which is central to the game plan of McKellar Communities, La Jolla, Calif.”, says Sherman Harmer Jr., vice president of the residential division. “We want to stimulate interest in upgrading lifestyle by promoting its benefits,” he says. “We’re trying to build a ‘discomfort level’ by getting people who might be tired of their old environment out to our new homes and interested in our new community.”

Besides the psychological switching costs, there is more to buyer psychology. Consumer behavior has been studied to see how wording a marketing phrase or altering situations can affect customer buy-in and adoption of new products. Kehoe states that asking questions with different wording will result in different answers [13]. In the example presented in [13], customers were originally asked the question, “What do you want when working with design/building contractors?” The answers received were generic and nonspecific (i.e., quality, responsiveness, professionalism, warranty, fair price). However, responses were a lot more detailed when the question was switched to, “What do you hate about working with contractors?” Knowing how to get details from the customers’ perspectives by correctly wording questions provides an opportunity to sell to the customers based on their point of view. This creates a higher potential for consumer buy-in for a new product [13]. Another aspect of buyer psychology is to start with why. Sinek did case studies on such companies as Apple to illustrate that consumers do not buy what a company does, but why the company does it. When the reverse occurs, (i.e. starting with what) it forces people to make decisions with the rational part of their brain and almost always overthink. These rational decisions tend to take longer than those that are made by an emotional response that occurs when starting with why [27].

With the examples from LaFreniere [26], Kehoe [13], and Sinek [27] it shows the importance to think like a customer to try and influence consumer behavior to achieve a desired result - innovation adoption in this case. Martin and Woodside believe the key to understanding any human action is through fieldwork and immersion into the human group of interest [28]. These marketing researchers used anthropology data collection methods via field observations, conducting lengthy unstructured interviews, examining consumer artifacts, and studying cultural folktales. Through their research, Martin and Woodside found five branches of Marketing Anthropology Research (MAR) that are beneficial to buyer psychology [28]:

1. *Interpretive Consumer Culture Theory* - Consumer culture is derived from social arrangements between lived culture as well as social resources. This theory examined the relationship between consumers' individual and collective identities.
2. *Unobtrusive Field Experiences* - Research here suggests that controlled experiences and real experiences result in significantly differing behaviors. Therefore, conducting research on consumers in the real world rather than in a controlled environment produces real behavior. A better understanding of a consumer's real behavior and how to influence it can be achieved this way.
3. *Participant Observation Research* - Researchers in this branch watch and interpret consumer behavior without consumers knowing it so consumer behavior does not change during the observation session.
4. *Participatory Action Research* - This strategy suggests that some consumer involvement in the research process helps improve the overall welfare of the study. It also implies that active participation by the consumers increases trust in the researcher.
5. *In-situ Long Interviews* - Researchers ask the consumers to share narratives of their experiences to provide valuable data about their behavior. These discussions are also used to help release information that is stored subconsciously about consumer psychology and behavior.

It is clear that understanding consumer psychology is important for innovation diffusion because this understanding will lead to the ability to design the environment and mechanisms to get the desired behavior change from the potential adopters. As mentioned earlier, any innovation's adoption requires a change on the part of the adopter. Therefore, knowing what change management mechanisms are available and could perforate the boundaries of new product adoption can possibly be very helpful to promote innovation diffusions. Therefore, the next literature review section is on the field of change management.

2.2 Change Management

2.2.1 Change Management within an Organization

Research has been done in change management, especially in organizational settings. Best practices in leading change [15], what is at the heart of change [16], and how to get change right by transforming organizations from the inside out [17].

Leading Change is a well-renowned book on change management written by Harvard Law

professor John Kotter. Based off of his experiences working with industry professionals and organizations in their attempts to transform (i.e., change) their companies, Kotter highlights that each successful change transformation process had to go through a total of eight different stages for the change to stick [15]:

1. *Establishing a sense of urgency* - A sense of urgency helps to motivate employees by showing them a need for change. Establishing this can be done through a variety of ways. The first thing is that change agents need to identify what the “crises” is and discuss this with employees. There are a variety of medias that can be used to do this such as personal conversations, meetings, flyers, posters, buttons, emails, etc. In larger companies, however, this becomes more difficult as reaching massive amounts of people can prove to be difficult as mass media communication techniques are not taken very seriously.
2. *Creating a guiding coalition* - There are certain personality types that can be combined to create a “guiding coalition.” This group is responsible for driving the change to keep moving the change process forward. The coalition needs to have pre-established leaders to establish its credibility, and it needs to be comprised of people with enough power to lead the change while always working as a united front.
3. *Developing a vision and strategy for the change* - A vision is used to direct effort of all employees without having to micromanage every employee. Any strategy that is developed should be done so in light of achieving the vision.
4. *Communicating the change vision* - Communication of the vision has to be done to get and maintain buy-in from employees. If the change vision merely is thrown at employees, the change will fail because there is not any buy-in. Specifically, the change vision should be clear and simple enough to be explained in five minutes or less. It also needs to be communicated through every vehicle possible to ensure its delivery. Two-way communication is best, though it is not always possible.
5. *Empowering broad-based action* - This step aims to enable employees to make choices that are in line with the vision even if it goes against the cultural norms of the organization. There are several ways to empower employees and the most important is to remove obstacles that hinder changes by altering any systems in place that undermine the change vision. The change agent also needs to make sure that risk-taking and nontraditional ideas, activities, and actions are encouraged.
6. *Generating short-term wins* - Changing something can be a very lengthy process, and one of the ways to try and keep people engaged is to celebrate success along the way. People

who were involved in the achievements should be recognized and rewarded so others can see what the correct behavior is.

7. *Consolidating and producing major changes* - The definition of this step means that once the change process has begun, new obstacles may surface and these obstacles need to be removed for the change vision to be successful. An example of this type of barrier is interdependencies within a company that are unnecessary and are only in place for bureaucratic reasons. By using increased credibility for the change from short-term wins, changing the systems and structures within the bureaucracies becomes easier.
8. *Anchoring the new approaches in the culture* - Unfortunately, a lot of change reverts back to its original state because the change had not grown into the company culture. In fact, sometimes traditional culture and new process can coexist, making the change look successful. As such, it is crucial to articulate the connection between new behaviors and organizational success, so the reasons for the change are known to everyone. It is also essential that in the event of a succession of organizational leadership, any new management believes the change is the right thing to do.

Kotter and Cohen later discussed real-world scenarios that they have encountered in regards to change, with a focus on altering people's feelings to alter their behaviors [16]. The pattern that emerged for successful change through the industry research that Kotter and Cohen conducted is what they refer to as "see-feel-change" rather than the traditional approach of "analyze-think-act." In the "analyze-think-act" approach, data, reports, presentations, etc. are presented to employees in a very formal way, thus trying to get people to change their thinking to alter behavior. In using the "see-feel-change" approach, the idea is to play on people's emotions by showing a problem to create dramatic, emotionally engaging, and compelling aids that go through the human senses (see, hear, touch) so that people *feel* why the change is important. These new feelings reinforce the new behavior needed for change, and it works better because the brain sends senses directly to the emotional response center which instantly instigates a reaction [16].

2.2.2 Personality and its Effect on Change Management

Wittig states that a variety of things can cause change failure, but they all tie into change resistance [21]. Due to this, it is vital that change agents focus on individual reactions (acceptance or resistance) during the change process. These attitudes to change can be influenced by emotions and cognition, communication, and participation in decision making [21].

Resistance is a multidimensional attitude toward change that includes a combination of cognitive and behavioral components. When combined, these dimensions create a change resistance spectrum from acceptance to resistance. Figure 7 represents the Spectrum of Employees' Reactions to Organizational Change (SEROC) which can be used to plot starting and ending points of individuals' change resistance levels during the change process. Starting and ending points are used to create a vector to indicate the direction a person moves along the SEROC during the change process [21].

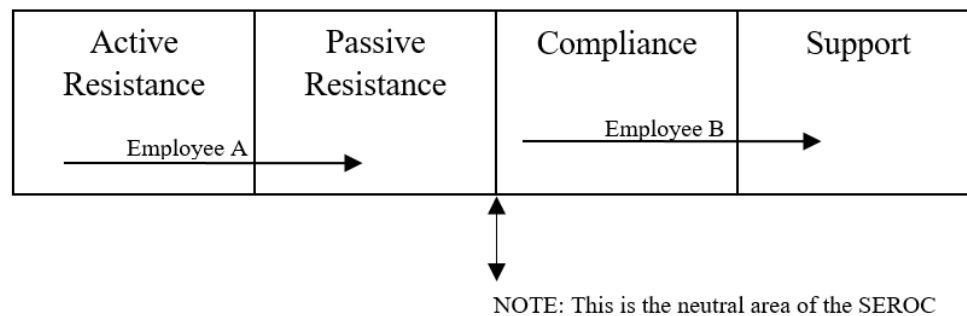


Figure 7 - SEROC [21]

2.2.3 Norms and its Effect on Change Resistance

Changing societal and cultural norms can also affect change resistance. If a good understanding of what issues can arise when trying to alter norms to instigate change, the chances of successful change increases [18, 19]. People decide what to do based upon what they think is (un)acceptable behavior to those around them. These standards are social norms. Social norms can change based on an individual's situation, location, time, and other social contexts. To define norms, they are rules that are not written but are implicit in the operation of society and defines how humans interact in society (note: a business or company can be a society). For example, there is power in corporate cultural norms because it sets the stage for organizational change and acceptance. "Informal" norms are classified as social norms, convention norms, and descriptive norms [18].

Cultural norms drive individual behaviors. Culture consists of a group of norms of behavior and the underlying shared values that keep norms in place [19]. By changing these norms, behaviors can be altered as well. However, changing these unwritten rules can be a prolonged process – especially those rooted in beliefs. Discussions and deliberations can play a crucial role in forming change. Individuals at higher levels in the culture that the norm exists should publicly commit to a change to get buy-in from lower level individuals [18].

Along with the norms, there is another concept called “tribes.” Here, Godin talks about a concept that he says goes back 50,000 years. His research has led to the idea that being part of a tribe is something that people yearn for. So much so that it is tribes and not external factors (such as money) that can align large numbers of people and affect change [29]. This “tribe” drives the culture of a company, organization, or society. The culture, in this context, is the personality of the company and like innovation adoption needs to be understood on a personal level to affect change.

2.2.4 Personal Change

Besides change management in the context of organizational changes, literature on change management at the individual level was also reviewed. Since almost all the organizational changes start at the company level, there is not much study focusing solely on change management from the individual and personal perspective. Research that has looked into change on a personal level comes from psychiatry. Research here looks at specific reasons for dealing with change from a therapy perspective or from changes with larger orders of magnitudes. No specific change techniques were proposed.

One example from a therapy perspective emphasizes the human change process in trying to understand a therapeutic client’s views of personal change [30]. In another example, modification of human behavior was addressed with social organizations in mind [31]. Reynolds and Branscombe argued that 1.) Humans are significantly more fluid in their behaviors than commonly thought, 2.) Social-psychological environments are a driving force for change in human behavior, and 3.) By moving past describing change to understanding processes of change, the field of change management can move more swiftly and efficiently forward to improve the overall quality of human experience [32]. This thought process provides some insights into why people change behaviors based on social pressures, but again, does not address it from the standpoint of purposefully driving change from an individual standpoint prior to a change occurring.

There has been some literature written on human behavior and on trying to make change work. C. Heath and D. Heath, through scientific studies, argued that humans need to understand how the mind functions in order to create “shortcuts” to make quick behavior changes. The authors used the concept of “see-feel-change” and provided real-life examples of how to try and implement this [33]. In another example, Ellis, the founder of cognitive behavior therapy, described how people react to change using the ABC mnemonic [34]:

A is the activating event (the change)

B is your thoughts or belief about the event

C is the consequence of your belief, such as the reaction, feelings, and behaviors

If an individual can **Alter** their **Beliefs** about an event by finding something positive, then an individual can alter the feeling (i.e. **Consequence**) that follows the event. The work also addresses what to do if a change is forced upon an individual. Ellis outlined a possible guideline for dealing with involuntary change [34]:

1. *Step 1* - Identify what specific aspects of the change are bothersome and then itemize these so a plan can be developed to tackle the new circumstances one by one. This will help an individual feel as if they still have some control over the forced change.
2. *Step 2* - Focus on the positive. Always look for something good and view change objectively. This step does not say to ignore the negatives, but taking an inventory of the gains and losses associated with the change can help to balance any negative emotions.
3. *Step 3* - Look for an opportunity to lead the change. Come up with ideas for adaptation or improvements in the situation as well as create new goals and pathways for success.
4. *Step 4* - Recognize negative reactions and do things to try and change them. Altering negative feelings can be done by finding new activities or even getting exercise. Doing these new things helps an individual to stay positive even when they do not have full control over change forced upon them.
5. *Step 5* - Try and find a way to restore a sense of personal control because this feeling can be lost when change is forced upon someone. By specifically looking for opportunities to gain a sense of mastery and achievement, a sense of control over a situation can be felt.
6. *Step 6* - Talk to others who have gone through a similar change. This instruction helps in brainstorming ways to bring more advantages to the current situation. This step will help an individual to feel as if they are regaining control over a situation that they do not like.
7. *Step 7* - Stay away from complainers. Try to spend time with people who avoid being rooted in negativity and resentment. Feelings are contagious so be sure to spend time with individuals who focus on the positive in a situation rather than the negative.

There has also been research into techniques on working with people from a managerial standpoint. Carnegie researched this and came up with four ways to influence people. He argued that by using 1.) Techniques to handle people, 2.) Making people like you 3.) Winning people

over to a certain way of thinking and 4.) Being a leader can influence people to behave “correctly” within an organization [35].

Another area that has been researched in individual change is how a person deals with grief and likened it to post change. This was researched by Kubler-Ross and her model was dubbed the “grief curve”. However, some have argued that the grief curve should really be called the Kubler-Ross change curve. In this model, Kubler-Ross identified five stages of grief that individuals go through during a period of sadness. Kubler-Ross further proposed that this model could be applied to any life-changing situation. The five stages are denial that the event is happening, anger in general or anger at the event, bargaining trying to alter the outcome of the event, depression because of the sorrow caused by the event, and finally, acceptance of the change. Figure 8 shows the curve that Kubler-Ross created to model this phenomenon [36].

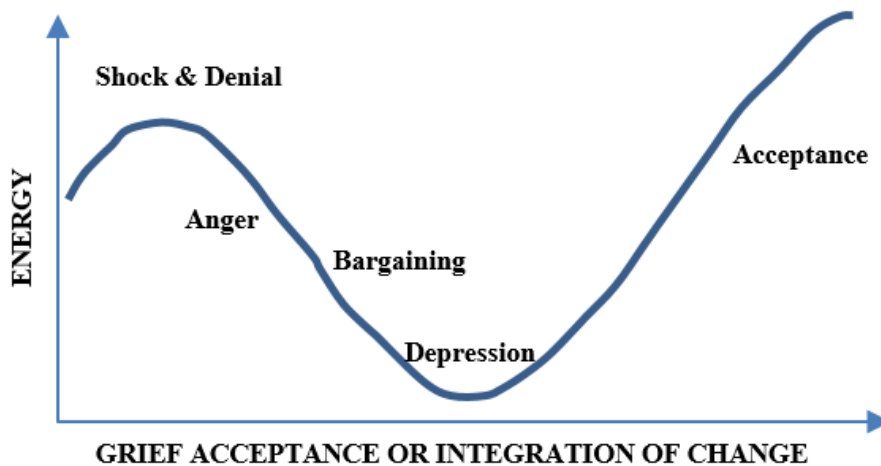


Figure 8 - Kubler-Ross Model [36]

By using all of these guidelines, models, and steps, an individual can move from actively resisting change, to passively resisting change, and eventually to acceptance. However, the issue with all of the above research is that, again, the literature does not talk about driving change from the start to get buy-in from an individual, but rather how to deal with it after the change has occurred - not investing in it up front.

2.3 Summary

Innovation adoption has been researched from many perspectives. Research on innovation adoption includes different types of diffusion media, personalities of potential adopters, population segments, and buyer psychology [2-8, 10-14, 25, 28]. All of this work has an aim of

achieving one thing: promoting successful innovation adoption. What has not been looked at is how change management techniques could be incorporated into innovation adoption. Part of innovation diffusion involves understanding why people behave a certain way because to have someone adopt a new product, a change in behavior is required. Incorporating change management principles and techniques will help companies better facilitate its innovation adoption.

Change management has also been researched substantially, but only from an organization's perspective. Many individuals have looked into creating steps for successful change as well as understanding how change can occur. Most of this research on change management has been from an organizational perspective internal to a company [15-17, 19-21]. Not much has been done looking specifically at how change management techniques can be tailored to alleviate innovation resistance and ultimately, increase diffusion. This leads to the question of how can innovation and change management be combined and connected to create innovation change management techniques.

3.0 Research Questions and Methodology

3.1 Research Questions

When looking at the research in innovation adoption, it is evident that people have to change their behaviors when they decide to adopt a new product or service. Knowing this leads to the question, “How could a company help individual customers change their behavior so that they become adopters?” To answer this question, identifying what types of adopter personalities are change-averse is important, as these individuals would resist innovation. Table 3 shows the research concepts that lead to combining personality traits with Rogers’ innovator adopter categories. It shows a summary of the personalities and characteristics of potential adopters in the five groups defined in the Rogers’ model.

Adopters: Personalities and Characteristics of each Category	
Innovators	
Venturesome	Intelligent
Educated	Social
Leadership	Daring
Able to cope with risk	Dreamers
Interested in “new”	Drive change
Early Adopters	
Empathetic	Intelligent
Project orientated	Educated
Technically focused	Social
Proponents of change	Leaders
Experimenters	Restless
Evangelists	Influencers
Multidisciplinary communicator	Self-efficacy
Early Majority	
Not usually leaders	Interconnected
Look for value	Pragmatic
Process	Communicators
Somewhat risk averse	Will accept change
Will adopt after it is proven successful	
Late Majority	
Skeptical	Cautious
Followers	Habitual
Can be persuaded	Frugal
Risk averse	Will accept change
Adopt out of necessity	
Laggards	
Like to be isolated	Cautious
Do not like change	Not leaders
Suspicious	Threatened by uncertainty
Wait until forced to adopt	Do not buy in to new ideas
Cannot financially afford to adopt	

Table 3 - Adopter Group Personality Traits [2, 37-40]

From determining personality characteristics among adopter categories, it can be determined that the first two types of adopters in Rogers' product adoption lifecycle (the innovators and early adopters), do not mind changes; in fact, they help to push reforms forward. However, when looking at the rest of adopter personalities, they have risk aversion tendencies (i.e., change aversion). No study in innovation adoption tried to resolve this risk aversion issue from a change management perspective. This lack of research leads to the question how change management techniques can be utilized within innovation adoption to help ensure successful adoption. Trying to answer this question indicates a gap in innovation and change management research. When researching innovation and change management, it was discovered that by combining change management amid diffusion, the results could positively affect diffusions of innovations. It should be noted that using change management techniques in the solution realization table (and then subsequently in to proposition) started in early majority and then moved to laggards. This was due to finding that the personality characteristics of innovators and early adopters were already likely to embrace change. Table 4 was developed from this research.

Solution Realization		
Change Management Technique	Diffusion Media	Who, How, and Result
Establishing a sense of urgency	Status Competition, Word of Mouth, Marketing/Advertising, See-feel-change strategies	Needs to be aimed at the early majority. It will show the adoption is useful and adds value. In doing this, more adopters are likely to occur.
Creating a guiding coalition	Status Competition, Socialization	This can be done by tapping into early adopters ability to be proponents for change. This coalition markets the innovation to early adopters by talking through pros and cons. This helps to move an unaware segment of a market into the innovation aware population thus creating more adopters in the early majority.
Developing a vision and strategy	Word of Mouth, Marketing/Advertising	The innovation marketing segment now has a vision that appeals to potential adopters in regards to their pragmatism. It helps to push change forward in the early majority.
Communicating the change	Word of Mouth, Marketing/Advertising, Socialization, Contact/Real Experiences	This provides opportunity to reach individuals in the early majority and late majority thus creating more adopters who usually fear change.
Empowering broad based action (people feel empowered to make the change on their own)	Interconnectivity Phenomenon	When the innovation adoption gets to the tipping point, individuals in the early majority will no longer have to be persuaded and will decide to adopt on their own and will move the adoption to the late majority.
Generating short-term wins	Marketing/Advertising, See-Feel-Change	Provides an avenue for those who need to see-feel-change in order to adopt the product and also who do not have a large amount of financial resources to buy the innovation. All of these can be incorporated in the Late Majority to help move the innovation forward.
Consolidating/Producing major change	Interconnectivity Phenomenon, Social Norms	When the innovation moves past the tipping point, the Late Majority starts to adopt out of necessity.
Anchoring change	Social Norms, Traditions	Diffusion at its maximum point, saturation, Laggards have no choice but to adopt.

Table 4 - Combining Change Management Techniques with Innovation Diffusion

Since both the innovators and early adopters are not only willing to accept changes but also promote the change, using change management techniques within these adopters would not improve to push an innovation's adoption along the diffusion curve. Therefore, the following seven propositions focus on the early majority, late majority, and laggards. These propositions suggest that by using change management techniques coupled with research done on consumer

and human behavior in innovation diffusion, a company can achieve higher rates of successful product adoptions.

One of the issues with the early majority adopting an innovation is that they are somewhat risk-averse. They are pragmatic [38, 39] and have to see value in whatever they are adopting [39]. They do not naturally feel a sense of urgency to change unless shown why they need to adopt an innovation [39]. Creating a sense of urgency within the early majority can be achieved through status competition, word of mouth, and marketing/advertising product diffusion techniques.

Note that the usage of these techniques throughout the adoption life cycle has been widely discussed, but no study suggested what message these techniques needed to focus on when delivering specifics to different groups of potential adopters. For early majorities, creating a sense of urgency helps to show early majority adopters the benefits and the reason for why they should adopt. Using “see-feel-change” strategies rather than “analyze -think-act” initiates an immediate emotional response to change making the early adopters want to change [16]. Another key aspect to promote a sense of urgency is utilizing individuals so they “fight” each other for status [10]. The following proposition was derived as:

Proposition 1: Early majority adopters will choose to adopt an innovation by establishing a sense of urgency within a market through implementing see-feel-change strategies, status competition, word-of-mouth and other marketing/advertising techniques.

In moving on the adoption curve from early adopters to early majority, one of the critical factors is that early majority individuals have to see the pragmatism of a product [2]. In change management, there is a group that is responsible for driving the change forward and is referred to as a “guiding coalition.” Personality types of this group are mavens, connectors, and salespeople. Mavens are people who have a strong compulsion to help others make informed decisions. Connectors are individuals who have ties in many different realms and act as conduits between them. Salespeople are people whose unusual charisma allows them to be extremely persuasive in inducing others’ buying decisions and behaviors [9]. Innovation research has shown that mavens can be used as change agents [41], but did not mention connectors or salespeople. Since connectors and salespeople have different personality traits and can help move ideas past the tipping point [9], it is important to consider these personality types as well as mavens as the champions to facilitate innovation adoption as well.

Since mavens, connectors, and salespeople type personalities are the individuals who start the epidemic of change, they usually fall within the innovators and early adopters groups. They help to push change past the tipping point of being an epidemic [9]. Artificially creating this epidemic can come through various ways of disseminating the information so that the unaware segment of potential adopters will change to the aware segment. The following proposition was derived as:

Proposition 2: Creating a guiding coalition from the innovators to champion the dissemination of information to unaware markets about the product by using idea champions whose personality types are maven, connector, or salesperson will help create early majority adopters.

Innovators and early adopters are the types of people who do not fear change, and in some cases even embrace it [2]. Where change starts to become an issue with innovation adoption is within the early majority. Early majority adopters are very pragmatic and they need to have ideas and innovations that “speak” to their pragmatism [38, 39]. Along with this, when looking at the psychology of buyers, they need to see that for every one con/cost with adopting an innovation, there needs to be at least three benefits. Otherwise, they will not adopt [14].

To help with this issue in buyer psychology, developing a vision and strategy can be used to direct effort of all employees to promote change without having to micromanage the effort [15]. The vision and strategy of a company should be clear and concise so it can be communicated to consumers through every vehicle possible [15]. Having a vision and strategy is important in innovation because it will create a sensible and appealing picture of what the future will look like for an individual after adoption. By developing a vision and strategy to complete that vision, the pragmatic personality of early majority adopters will be satisfied. The following proposition was derived as:.

Proposition 3: Developing a vision and strategy that is clear and concise and can easily be communicated via every vehicle possible to maintain buy-in from customers will create an increased rate at which early majority adopters will adopt innovations.

Another challenge within innovation adoption is getting to the point where the innovation can sell itself [22]. When this happens, the innovation gets to the tipping point and individuals in the early majority will no longer have to be persuaded. They will decide to adopt on their own because the product has been proven to be successful [2]. One way that a product can prove its success is through the interconnectivity phenomenon. The interconnectivity phenomenon is a case where the more a product is adopted, the more it enhances its own information distribution about the

innovation. The problem with using the interconnectivity phenomenon to spur adoption is initial barriers to adopt because the early majority is somewhat risk averse [2].

Empowering broad-based action is a term used in change management that addresses the issue of being somewhat risk-averse. Empowering broad-based action is defined as making people feel empowered to make the change on their own by removing obstacles in their path [15]. By using strategies (such as having a 3:1 ratio of pros/cons [14] or utilizing see-feel-change strategies [16]) to empower broad-based action, the interconnectivity phenomenon is more likely to happen. It is important to have the interconnectivity phenomenon occur because it will move the innovation diffusion through the early majority adopters into the late majority. The following proposition was derived as:

Proposition 4: Empowering broad-based action by utilizing the interconnectivity phenomenon will move the product diffusion past the tipping point of early majority into late majority.

Innovation adoption within the late majority sometimes does not happen because these individuals are change averse and usually do not like to use up financial resources [2, 40]. One way to combat this is to use the change management technique of generating short-term wins. This provides an avenue to gain product buy-in through short-term marketing techniques such as tax deductions, promotions, or free samples. Doing these things will help the late majority adopters to initially adopt. Along with this, using see-feel-change strategies within marketing/advertising will promote emotional reactions to the innovation adoption thus resulting in a higher percentage of late majority individuals to adopt. The following proposition was derived as:

Proposition 5: Generating short-term wins through incentivizing and see-feel-change strategies will lead to an increased rate of late majority adopters.

Another issue with getting late majority personality types to adopt an innovation is they adopt out of necessity [2]. This creates a problem with the late majority adopters. By eliminating the old product through the interconnectivity phenomenon, any product left will become obsolete. This means any adopters left have no choice but to adopt because they do so out of necessity [2].

In change management, consolidating and producing major change is done by removing anything that is left that could hinder the change's advancement. It is also ensuring that the change has become part of a new social norm to ensure that the change does not revert back to its original

state [15]. By removing old technology through the interconnectivity phenomenon, the social norms will change. The following proposition was derived as:

Proposition 6: Consolidating and producing major market change for innovation adoption by recognizing when the interconnectivity phenomenon can be utilized to create social norms will lead to increased adoption with the late majority adopters.

One of the final pieces to complete innovation adoption is having the market saturated to the point where laggards have to adopt. The problem with this is that the only way laggards will adopt is if they are forced to as they do not like change and do not buy into new ideas [2, 40]. In product adoption, social norms and traditions are rules of behavior that are considered acceptable. This is important in product adoption because once something becomes a norm, the product becomes saturated in the market. However, this does not ensure that it will remain. In change management, anchoring change is to ensure that the new change has grown “roots” in the culture [15]. In innovation adoption, this will be evident in widespread use of the new product. This symbolizes that the change has become norm and tradition thus anchoring it in the culture. The following proposition was derived as:

Proposition 7: Anchoring new products into the market/consumer culture by using social norms and traditions will lead to total diffusion into the market leaving the diffusion at its optimal point.

These propositions, when used in conjunction with one another, will create successful innovation diffusion. Figure 9 shows where these propositions fall along the Rogers adopter and s-curves.

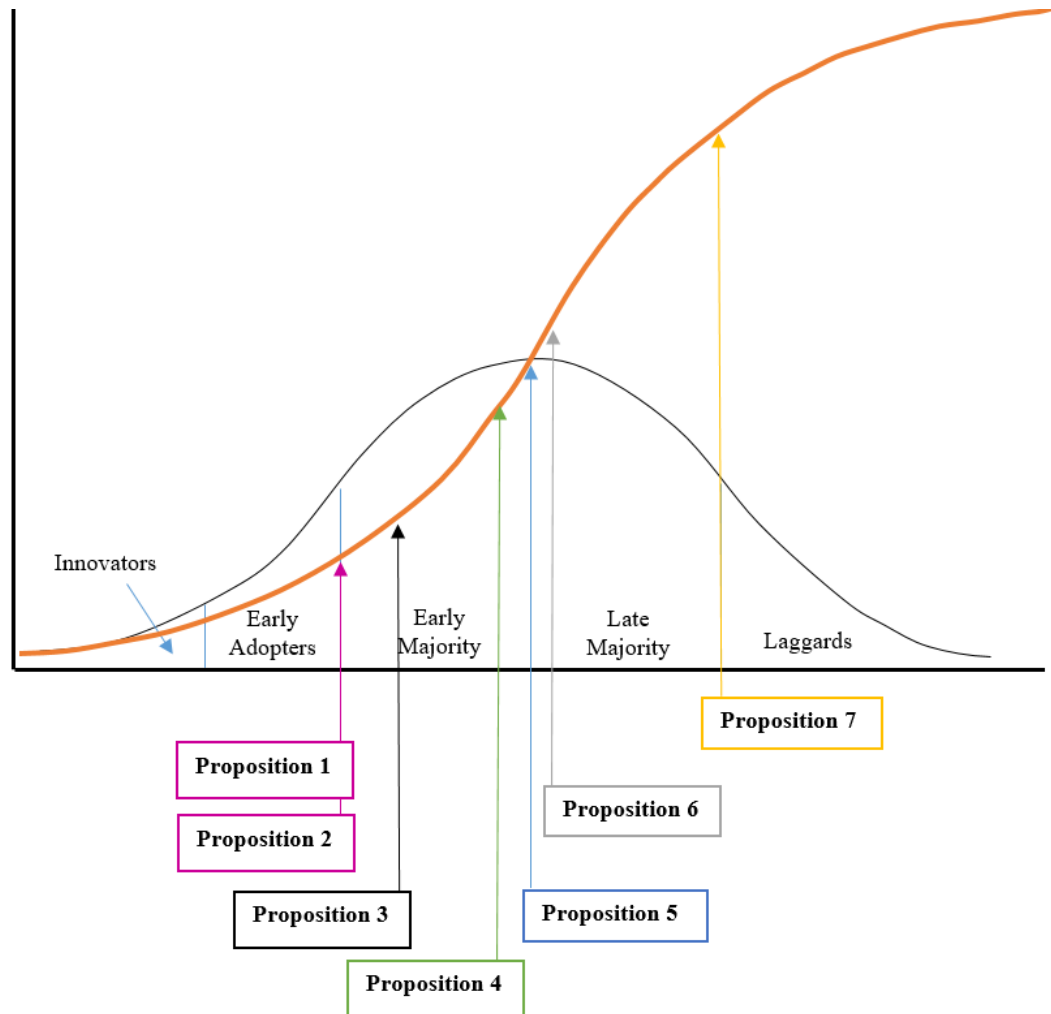


Figure 9 - Proposition Locations along Adoption Curves

3.2 Research Method

In order to evaluate the propositions presented earlier in section 3, case studies were conducted. The first case study looked at social networks. The first social network, Friendster, died out whereas the next two who entered social networking (MySpace and Facebook) garnered millions [42] and billions [43] of members, respectively, and are still in existence today. Due to Friendster's lack of longevity, it was deemed a failure in innovation adoption. In contrast, due to the longevity and the number of adopters, MySpace and Facebook were deemed successful.

The second case study focused on electric vehicles. There were two different eras in which the electric vehicle emerged. In the first era, General Motors' EV1 was deemed a failure because all of the cars were removed from the highways shortly after the innovation was released [44]. In the second era, the Toyota Prius and Tesla were evaluated as successful adoptions because their overall adoption and stock prices have steadily increased since their unveiling [45]. Both of these companies and vehicles are still in existence today.

This history and information of all three of the social networks and car companies were compared to the propositions. The following is a summary of the case studies described above:

1. Social Networks
 - a. Friendster (failed)
 - b. MySpace (successful)
 - c. Facebook (successful)
2. Electric Vehicles
 - a. EV1 (failed)
 - b. Toyota Hybrid (successful)
 - c. The Tesla (successful)

In order to find information on all of these companies, research for the case studies was acquired in a variety of ways.

For social networks, research media included looking at scholarly articles on these social networks. The details for the propositions were also found through extensive research on published non-fiction books about Friendster, MySpace, and Facebook. It also included looking at the companies' existing websites. The information for the electric vehicle case study utilized similar research media. Scholarly articles on innovation adoption of the electric vehicle were studied. Video documentaries about the history of the car companies were examined for information relevant to the propositions. Lastly, details for the electric vehicle case studies were

found from evaluating car companies' websites, media articles, press releases, and shareholder letters.

The information on each of the cases was collected and summarized for each proposition in the case studies. The data information found included detailed accounts of the history and number of adopters at a given point in the companies' history. The following section provides a description of each case as well as the data found for each proposition.

4.0 Case studies

4.1 Cases on the Social Networks

Today, social networking comes in various forms and sites across the internet, but this was not always the case. Social networking took off around the turn of the 21st century. In the mid-1990's, the very first social networking site started [46]. However, due to the timing of the launch, the internet and user infrastructure was not adequate to support its adoption. After the first failed attempt at social networking and as the internet and PCs started to become popular [47] so did the opportunity to begin successful networking sites online. Innovators who did this wanted to reconnect the world via a different social platform which started the modern social media movement [48].

In this section of case studies, the adoption of Friendster, MySpace, and Facebook are investigated to validate the propositions derived in section 3.1

4.1.1 Background

Friendster was a social networking site launched in 2003 and is known as the grandfather of all social networks [46, 48]. Though it was not a dating site, it provided an avenue for members to try to find dates once they were connected with friends and friends of friends. When Friendster became open to the public, it was an immediate hit. It gained several million members in the first few months [47]. However, Friendster was not able to scale itself at the same rate as demand, and it ran into technical issues. In 2011, it abandoned being a social networking site and instead changed to a social entertainment site until it was shut down entirely in 2015.

MySpace was a social networking site that focused more on the entertainment industry rather than focusing on individual friendships and dating. It launched in August of 2003 to the general public and had immediate success garnering its millionth member in January 2004. Founders would travel to clubs to get bands to join because this would lead to fans joining as well. During these events, the founders would also invite current MySpace members to a "members only" party scene [47]. MySpace has had 125 million members [49] and the site is still in existence today [42].

Facebook (formally known as thefacebook when it started) was launched in February of 2004 on the Harvard University campus. It instantly gained rapport with the college students, alumni, and staff and was such a hit that Facebook's founders decided to launch it at other college campuses

and eventually to the public [50]. Unlike Friendster, Facebook was able to keep up with the usage demand of their site and have since become one of the most successful social networking sites in history. Since its inception until now, Facebook has garnered over 1 billion active users [43].

4.1.2 Proposition Validation

In taking the information found in the case study for social networks and looking at it in conjunction with the propositions found in section 3, the following evidence was found in support of propositions 1-7.

Proposition 1

Early majority adopters will choose to adopt an innovation by establishing a sense of urgency within the market through implementing see-feel-change strategies, status competition, word of mouth techniques and marketing/advertising techniques.

Friendster was able to establish a sense of urgency within users through status competition by linking friends' accounts together. It became a popularity contest to see who could amass the most amount of "friends." In three months' time, they even had 3 million users [47]. However, the problem here was establishing a sense of urgency within a see-feel-change strategy. The more users that were added to the network, the more the servers slowed, never giving members the opportunity to *see* why they should continue to use Friendster or recommend it to their friends. Unlike Facebook, Friendster's staff never added more infrastructure to accommodate the growing demand. This meant as people signed up to use the program, it was slow and ultimately turned people away [46, 50]. The sharp initial jump in users followed by stagnation and then decline can be seen in Figure 10 and the dates of when these occurred correspond to the events mentioned above. Because Friendster did not follow what was suggest in proposition 1 and subsequently failed, this information is also in support of proposition 1.

The MySpace founders were able to establish a sense of urgency similar to how Friendster did, but with some important differences. The similarity was they were able to create a competition between users. MySpace users wanted to amass the most amount of "friends" on the website to demonstrate their popularity. MySpace also had a feature where a user's first eight friends would have pictures on that user's profiles. Doing this meant that as more users joined MySpace, individuals would compete to be "first friends" so their picture would be displayed (this was later changed to be customizable and was referred to as the "Top 8"). Along with this, MySpace was able to use a see-feel-change strategy with their site the same way Facebook did. Once a user was

logged on, they were able to navigate without the pages slowing down due to lack of infrastructure and this helped users *see* why using MySpace was great. Also, users did not have to use a generic template for their profile. They were able to customize their pages by inserting web markup language, and it allowed users to express themselves - especially the early adopters of the site. Ironically, letting this happen was originally a mistake by MySpace, but since users loved the feature, they kept it. This customizable piece meant that users would want to get the newest songs, ideas, information, etc., onto their profiles before others did. Lastly, one of the founders of MySpace (Tom Anderson) would use word-of-mouth and advertising techniques to spread news of MySpace parties. These parties were set up so only MySpace members could attend. It created a sense of exclusiveness and belonging among members. It made others want to join MySpace to be a part of that exclusive group [47]. When these MySpace parties started in November 2003 and continued throughout 2004, the amount of Myspace users jumped from 1 million members to 27 million in 2005 [47]. This surge in membership identified by using the above techniques supports proposition 1. Figure 10 shows this in a graphical representation.

Facebook was able to establish a sense of urgency within users through status competition the same way that Friendster and MySpace did. Facebook also used see-feel-change strategies, word-of-mouth, and advertising techniques when creating urgency. Initially, Facebook only allowed EDU (i.e., college) address and Ivy League schools to add accounts on Facebook. Letting certain schools on an elite list left other schools begging to be put on this list for Facebook accounts. Once the college market was saturated, the same could be said about high school students. They wanted to be a part of Facebook because it felt exclusive. Along with this, it soon became a competition among users and friends to see who could accumulate the largest number of Facebook “friends” to establish one’s popularity within their communities. There was no cost associated with joining, and it was effortless to get an account. It meant that a person could see first hand what Facebook was like without incurring any psychological switching costs. Since Facebook was able to manage their growth without interrupting the processing speed of the site, those that used it kept using it because of its ease and benefits. Lastly, other schools around the nation had heard about what Facebook was doing via press and word of mouth techniques. Friends would tell “back home” friends about Facebook. College newspapers would write about Facebook, and slowly and surely, larger newspapers jumped at chances to cover Facebook as its popularity grew [50]. All of these strategies (see-feel-change, status competition, word of mouth) when combined created many users very quickly. Within a few months, from October to December 2004, Facebook had accumulated 1 million members [43]. The number of initial users

who decided to become members of Facebook within this short amount of time can be seen in Figure 10. The success in adoption numbers along with the sense of urgency techniques is in support of proposition 1.

Proposition 2

Creating a guiding coalition from the innovators to champion the dissemination of information to unaware markets about the product by using idea champions whose personality types are maven, connector, or salesperson will help create early adopters.

Finding a guiding coalition for Friendster was very difficult. Though an exhaustive search was conducted, no specific persons could be identified as the key personnel that championed the idea of Friendster to promote its adoption in the market place. Jonathan Abrams was really the sole individual who started Friendster as the founder and manager of the site. Without many media exposures or stories shared in literature, news and biographies, it is hard to connect Jonathan Abrams's personality trait to the ones typical for maven, connector, or salesperson. This lack of evidence on the existence of a guiding coalition for Friendster combined with the failure of this social network site is in support of proposition 2.

For MySpace, there were a few different people at the forefront of the innovation. They were Tom Anderson and Chris DeWolfe [47]. Tom Anderson was the salesperson. He would go to nightclubs and bars to talk with people and bands about joining MySpace in order to make the interconnectivity phenomenon take place. Many of those whom he talked to became MySpace members [47]. Unfortunately, there was not a lot of information on what the other founder did to try to get buy-in for the product. Without finding information on mavens or connectors, it makes it difficult for personality typing in the guiding coalition. It could be the reason why MySpace did not reach the same level of users as Facebook.

Three significant contributors helped the adoption of Facebook, and all three individuals played a different role. Sean Parker was the salesperson of the group. Any meeting that the Facebook team held, "he worked his sales magic," and was able to get buy-in from investors to continue growing Facebook's server infrastructure [50]. This unique charisma allowed him to be extremely persuasive [9]. Next was Mark Zuckerberg. Zuckerberg was the original creator of Facebook and as such had a vast amount of knowledge of about this social networking site and why previous ones had failed. He wanted to be transparent with Facebook and any decision associated with it so individuals would make the informed and purposeful decision to sign-up for Facebook. His

actions are in line with that of a maven [9]. Zuckerberg believed it was by far the best communication tool of the modern era. Lastly, Dustin Moskovitz's role "was critical to Facebook's success," according to CEO Mark Zuckerberg. Moskovitz was responsible for connecting colleges that were not on Facebook yet. He had to know who to contact and how to get information regarding e-mail addresses for students, staff, and alumni so he could set up the registration procedure. He also had to obtain a list of courses, residential dorms and set up a link to the college newspaper [50]. By knowing who to contact and connect with, he was able to do this successfully. These efforts and knowing who to contact makes Moskovitz a connector [9]. All of the things that Parker, Zuckerberg, and Muskovitz did lead to increased members during the start of Facebook and this can be seen in Figure 10. In the first two years of Facebook is when these individuals were behaving as mavens, connectors, and salespeople. After this had taken place, the number of adopters begin to increase exponentially. Armed with this information, it can be argued that these individuals became a guiding coalition made up of distinct personality types (i.e., mavens, connectors, and salespeople) that helped to diffuse Facebook within their consumer base. Having these personality types help to spread the innovation [9]. This information is in support of proposition 2 and can be seen in Figure 10.

Proposition 3

Developing a vision and strategy that is clear and concise and can be easily communicated via every vehicle possible to maintain buy-in from customers will create an increased rate at which early majority adopters will adopt innovations.

According to Friendster founder Jonathan Abrams, he wanted to build a better way to meet people online. Friendster was also able to communicate their vision, but did not use whatever resources were at their disposal and as such investment support dwindled. At first, Friendster was able to attract venture support to get upfront capital from communication with investors. However, Friendster did not have a long-term plan to be sustainable. This can be seen through Friendster's lack of awareness on the capacity and programming side of their architecture and not gaining support to increase capacity. Their vision was short term as there was no strategy associated with how to make Friendster maintainable. [47, 50]. Figure 10 also shows how Friendster's lack of communication for resource development of their vision and strategy lead to short term growth rather than making it sustainable long term and this is in support of proposition 3.

The vision for Friendster was very different from that of MySpace. MySpace's vision was defined as being the MTV of the internet. They wanted to use their site as a marketing tool for bands. MySpace thought if bands and musicians joined, so would their subsequent fanbases. To advertise, MySpace used banner ads on websites, sent out mass emails (similar to SPAM), held parties across the United States, and went to clubs to talk with people and bands about MySpace. Founders also spoke with bands about becoming members because MySpace was a useful marketing tool for music bands. Whatever vehicle MySpace could think of to spread the word about their site, they used it [47]. MySpace parties started in November 2003 and continued throughout 2004. The amount of Myspace users jumped from 1 million members to 27 million in 2005 [47] during and right after these parties and advertising techniques took place. This increase in users supports proposition 3. Figure 10 shows this in a graphical representation.

Facebook's vision was also very different from MySpace's. The vision for Facebook came directly from the CEO Mark Zuckerberg. This vision was consistently repeated throughout the history of Facebook. He wanted Facebook to change the world. He wanted something that had lasting cultural value in creating the most efficient way to stay in touch with friends. The strategy for deploying this was three phase. The first stage was to issue the site to colleges, the second was to allow college users to start inviting their high school aged friends to join as Facebook members, and the last stage was to let anyone join Facebook through open registration. The communication was simple: join Facebook. One way this was communicated was through social networking – Facebook itself. Other methods included word-of-mouth and mainstream media coverage. Articles were written in newspapers such as the Washington Post. When companies would take out advertisements, the advertisements included their Facebook page URL (this included both TV ads and physical flyers) [50]. At each stage of “new” communication, there was a large increase in members. For example, it can be seen in Figure 10 that between the fall of 2005 when Facebook was opened to high schools and then in fall 2006 when it was opened to the public, the amount of users increased almost three fold from 4 million members to almost 12 million members. After Facebook was released and communicated to the public, member numbers doubled from 12 million in December of 2003 to 24 million 5 months later. This increase in users by communicating the vision supports proposition 3.

Proposition 4

Empowering broad based action by utilizing the interconnectivity phenomenon will move the product diffusion past the tipping point of early majority into late majority.

The way Friendster began with utilizing the interconnectivity phenomenon, but throughout its existence, this phenomenon started to act in a negative way. As members began using Friendster, electronic invites were sent to their friends inviting them to join. Initially, this had the a positive interconnectivity phenomenon. However, just as the interconnectivity phenomenon can be used for positive gains, it can also be used negatively. As a user's friend left Friendster, it lessened the engagement of the user's friends. This decrease in participation lead to the latter also leaving thus creating a negative interconnectivity phenomenon [51]. A decrease in Friendster members from this phenomenon can be seen in Figure 10. This information is in support of proposition 4.

MySpace also used the idea of "friending" for creating an interconnectivity phenomenon. However, instead of solely focusing on friends "friending" friends, MySpace also focused on getting bands, well-known individuals, and women who would post pictures of themselves scantily clad because all three of these groups attracted a lot of people to MySpace. The more "celebrities" joined, the more bands, celebrities, and attractive females joined MySpace, so did more users. An example of this was Mattel's Barbie Girls attracted 4 million new MySpace members in less than four months [47]. Since adding one member resulted in so many additional members, it can be argued that the interconnectivity phenomenon was taking place and as such is in support of proposition 4.

Facebook thoroughly understood the power of the interconnectivity phenomenon even if they never used the term explicitly. Initially, only colleges could join Facebook. Within these schools, students could send invites via email asking them to be "friended." This type of communication meant that one person joining Facebook could lead to a multitude of other uses. Mark Zuckerberg explained, "Wherever we expand the network, we make the network stronger." This was also the case when the choices were made to allow high school age users. The only way they could be added was by being "friended." The more people used Facebook, the more people joined. This friending was also true with open registration even though a person no longer had to be "friended" to join [50]. After open registration is when Facebook's member numbers dramatically increased. With college and high school students, there is a finite number of individuals who can be members, whereas with open registration, there is not. Open registration began in the fall of 2006 and there was an immediate jump in members from 1 million to 4 million in 5 months. 4 months after this (and 9 months after open registration began), there were now 50 million members. In the next month alone, December 2007, there was an additional 8 million members who joined Facebook. By December 2008, there were 145 million members [50]. This pattern of

increasing member numbers has continued since this point. All of these dates and values can be seen in Figure 10. Such an increase in member number supports the interconnectivity phenomenon was taking place and is in support of proposition 4.

Proposition 5

Generating short term wins through incentivizing and see-feel-change strategies will lead to an increased rate of late majority adopters.

A year after Friendster launched, they started looking into how they could make money from their users [52]. These tactics were opposite of creating short-term wins, because the method of charging users looks more like a cost than a win for the users. This meant there appeared to be an upfront cost with no additional benefits. Even the threat of charging for usage could deter new users because there is a perceived psychological switching cost associated with using the network. This is not in line with create short-term wins and is possibly one of the reasons Friendster failed.

To create short-term wins for users, MySpace had a different strategy. When the site was first launched, the president of eUniverse (the parent company of MySpace), sent out emails telling employees to join and that there would be a \$1000 reward for whoever could create the biggest “friend” network. Along with this, the parties that MySpace founder Tom Anderson hosted helped to create a sense of membership in the short-term. He also gave away T-shirts to the first members to arrive at these parties. Anderson hosted parties in 17 different cities across the U.S. to show people what it looked like to be a part of the MySpace community [47]. These MySpace parties started in November 2003 and continued throughout 2004. It can be seen in Figure 10 that the amount of Myspace users jumped from 1 million members in January 2004 to 27 million at the end 2005 [47] after all of these events had taken place. Generating these short-term wins and increasing member numbers is in support of proposition 5.

Facebook’s strategy for generating short-term wins was two-fold. They allowed organizations and businesses to create Facebook accounts that led to these companies offering quick discounts to users as long as the users would “join” the company’s group or “like” the companies’ Facebook page. Facebook also created short-term wins through see-feel-change strategies via activist groups. One group, in particular, happened in Colombia. An individual by the name of Oscar Morales was fed up with a hostile group in his country, so he created a Facebook group against FARC (which is the Spanish acronym for Revolutionary Armed Forces of Columbia). “It was like

therapy,” he is quoted saying, “I had to express my anger.” What he ended up doing is creating a group in which people could vent in the short-term and also stage demonstrations in their towns. Many activists joined the group which gave them a quick feeling of validation [50]. These groups were beginning to form at the end of 2008. It can be seen in Figure 10 that this is the point that member numbers began to increase exponentially. Generating these short-term wins and increasing member numbers is in support of proposition 5.

Proposition 6

Consolidating and producing major market change for innovation adoption by recognizing when the interconnectivity phenomenon can be utilized to create social norms will lead to increased adoption with the late majority adopters.

In regards to norms, Friendster was not able to successfully create a culture around its networking site and therefore, was not able to create a social norm. By abandoning the interconnectivity phenomenon due to a lack of infrastructure, it was impossible for Friendster to diffuse far enough into the market to become a norm in society; there weren't enough people using the site on a consistent basis. The lack of utilizing the interconnectivity phenomenon paired with the failure of Friendster is in support of proposition 6.

The founders of MySpace felt like they had something special that would last the test of time and this is different to how Friendster looked at their site. MySpace understood how certain individuals (bands, celebrities, etc.) would lead to more users for their site, so MySpace purposefully targeted these individuals who allowed the interconnectivity phenomenon to take place. Without utilizing this phenomenon, MySpace would not have had enough people using their site to be considered a norm in society. This information is in support of proposition 6.

Mark Zuckerberg constantly reminded his team at Facebook that they could alter a social norm and their feeling of having something special was similar to MySpace's mentality. In fact, this was their overarching vision; Zuckerberg wanted to change the way the world communicated with one another. He realized that by using the interconnectivity phenomenon, it would saturate target markets. As target markets were saturated, Facebook would move on to the next target. Purposefully utilizing the interconnectivity phenomenon in this way meant that as membership increased to millions of people, using Facebook would lead to a social norm because everyone would be using site. Figure 10 shows this very well. As the interconnectivity phenomenon was taking place, growth of members was occurring exponentially which started to govern the

behavior of individuals who wanted to be part of Facebook, thus turning it into a social norm. Facebook becoming a social norm based upon using the interconnectivity phenomenon is in support of proposition 6.

Proposition 7

Anchoring new products into the market/consumer culture by using social norms and traditions will lead to total diffusion into the market leaving the diffusion at its optimal point.

One of the more apparent differences between Friendster, MySpace, and Facebook is that two established themselves into social norms and one faded out and is no longer in existence. Since Friendster did not diffuse enough into the consumer market to be a social norm, there was not any way that the innovation could be anchored into society. Friendster never had the opportunity to become a social norm because it was not sustainable from an infrastructure standpoint. It did not have roots grown into society's culture which made it easy for current adopters to revert their behavior change and prevent potential adopters from changing. Figure 10 represents this by showing how, after an initial increase in members, the site no longer governed the behavior of individuals and it fell from its progress to becoming a social norm. This failure partnered with Friendster's failure is in support of proposition 7.

In contrast to Friendster, MySpace was able to garner enough members to be considered a social norm. In January 2015, MySpace had reached 125 million active members at its peak [49], and the site is still in existence today. Figure 10 shows how MySpace has increased its user base to the point where it has become that is a standard for social media. It still focuses more on the music scene than Facebook, and one can argue this is why the two have been able to coexist. Figure 10 also shows the two have been able to coexist and garner members at the same time.

Like MySpace, Facebook successfully anchored itself into norms, but did so in the social networking and communication culture. Not only does Facebook have over 1 billion members [43], large and small businesses, schools, different types of groups, celebrities, nonprofits, colleges, and universities all have accounts. Since it has become such a large part of how people and companies communicate every day and has been for several years, it has settled into a sustainable social norm. Adopter personalities who do not like change are forced to adopt since it is now a social norm. This can be seen in Figure 10 as the top of the Facebook adoption curve begins to level out around 1 billion users. Since Facebook was able to anchor itself into the consumer culture because it established itself as a social norm is in support of proposition 7.

4.2 Cases on the Adoption of Electric Vehicles

100 years ago at the turn of the 20th century, more electric cars were being driven than gas ones. The electric cars were quiet and did not require being cranked to start as gas cars did. However, by 1920 with the addition of auto starts, cheaper oil, and mass production, internal combustion engines were the vehicle of choice. Of the cars built in the 20th century, most were internal combustion engines rather than electric vehicles [44].

As years passed and more combustion engines were purchased across the country, their number one flaw became apparent - emissions. Air quality suffered. Smog (which is defined as fog or haze combined with smoke and other atmospheric pollutants [53]) could visibly be seen in such cities such as Los Angeles. In 1987, a study conducted by Sherwin and Richeters of the University of Southern California found that one out of four 15 to 25 year-olds who had been living in southern California had a severe illness in their bronchial linings [54]. This led to increased public awareness on smog health issues which then led to innovations (such as electric vehicles) that tried to lessen the unwanted haze.

In these case studies, the adoption of GM's EV1, Toyota Prius, and Tesla Roadster, Model X, and Model S (as all three models are part of Tesla's vision) will be investigated to validate the propositions derived in section 3.1

4.2.1 Background

After General Motors (GM) had won a world solar car race in 1987, the company wanted to build a practical version of an electric vehicle. GM's CEO challenged the design team to develop a prototype. This car came to be known as the EV1, and in 1996, people began adopting them in California. They were stylish, quiet, required no gas, and had a range of about 120 miles per charge. Ten years later, they were gone [44, 55].

In 1993, Toyota started to have in-house conversations about what the future of "clean" (i.e., energy efficient) vehicles might be. From these discussions, the G21 Project was launched. G21 was a project dedicated to finding ways to improve fuel efficiency and to be the trendsetter for cars in the 21st century. The goal of the G21 project was to raise fuel efficiency to 1.5 times that of traditional vehicles. Thus entered the idea of a hybrid because it had the potential of doubling the fuel efficiency [56]. Based upon this idea of a hybrid, the concept was built and improved until the Toyota Hybrid Prius was released in the United States and Europe in 2000. To this day,

Prius vehicles are still being manufactured and sold (almost 4 million) as well as many other brands and styles of hybrids in competing companies [56].

As modern technology improved, so did the concept for electric vehicles. Tesla (an electric vehicle company) was originally founded in 2003 by a group of engineers who wanted to change the way the world viewed electric vehicles. They believed that electric vehicles could be faster, quicker, and more stylish than conventional gas vehicles meaning society would not have to compromise in the switch over to electric vehicles from internal combustion engines. The first commercially available Tesla, the Roadster, was launched in 2008 using innovative battery technology and it changed the face of electric vehicles. From here, the Tesla Model S was designed and developed as well as the sport-utility Model X in 2015. Today, Tesla is known as one of the leading electric vehicle manufacturers [57, 58].

4.2.2 Proposition Validation

In taking the information found in the three cases for electric vehicles and looking at it in conjunction with the propositions found in section 3, the following evidence was found in support of propositions 1 - 5. As the diffusion of EV's is still in its early stage, propositions 6 and 7 cannot be tested using this case.

Proposition 1

Early majority adopters will choose to adopt an innovation by establishing a sense of urgency within the market through implementing see-feel-change strategies, status competition, word of mouth techniques and marketing/advertising techniques.

With the EV1, initially it seemed that GM was trying to use see-feel-change strategies by showing the car at car shows. However, these car shows did not have test drives so there was no way to show customers how cars worked. Along with this, GM only manufactured a small amount of cars. This small number of vehicles on the road meant that few potential customers saw the car in action. The EV1 commercials did not even show a picture of the car moving. It was stationary with a voiceover describing aspects of the car rather than *showing* its speed, range, or power. The GM reps also tried to use word-of-mouth techniques. However, they used it to communicate the limitations of the product rather than the benefits. These limitations were not only communicated to potential buyers, but to individuals who had committed to buy an EV1 on a waitlist [44]. From understanding buyer psychology, this completely goes against efforts to create a 3-1 benefit to cost ratio [14]. This brought the buyer wait list down from 4,000 people to

50. In regards to status competition, there were some celebrities that had the EV1, but since there was not general knowledge about the EV1 (people randomly surveyed had never heard of it) it is hard to argue that status competition was created within the potential adopter market [44].

With the Toyota Prius and Tesla, their strategies for creating a sense of urgency aligned with change management techniques, unlike that of the EV1. Toyota focused on using see-feel-change strategies in order to create a sense of urgency in its consumers. One such strategy was to create a hybrid vehicle to run on gas and switch over to electric [59] in order to increase the benefit to cost ratio within psychological switching costs. Creating a hybrid also showed drivers what electric vehicles were like without consumers having to give up internal combustion engines entirely. Toyota also issued several campaigns to help spread the word about the Prius [59] in an effort to spread information on the Prius through word-of-mouth techniques. One such campaign was called the Engine of Change tour. During this tour, the company went to 15 different state governments to meet with government officials, media, and environmental advocates to talk about their hybrid [59]. Also, Toyota was able to create status competition for their product by having a wait list for their hybrid vehicle [59]. This made it so some people would get their vehicle before others and those people who wanted to be seen as having the latest and greatest, would want to be on the waiting list first [59]. Lastly, Toyota's advertisements focused on appealing to consumers' emotional side. Rather than telling consumers why they should have a Prius, they showed potential adopters by having commercials and pictures of driving a hybrid through a rainforest or showing what the world would look like with less pollution [59, 60]. All of the see-feel-change, status competitions, word-of-mouth, and advertising techniques listed above occurred in the year 2000 through 2001. Figure 11 shows that the number of adopters increases tenfold in the few years after these strategies were used. This is in line with the proposition that using these strategies will create a sense of urgency within consumers.

Like Toyota, Tesla focused more on see-feel-change strategies to create a sense of urgency within consumers. Tesla had car shows and test drive events to show potential buyers the quality of the electric vehicle so that the buyer would *see* that a mainstream electric car can be of higher quality than a gas car. They also did this to show people the range that these new electric cars had (400 miles vs the EV1's 100 mile range), because this had always been a concern for potential buyers. Along with this, Tesla was able to create status competition in two ways. The first status competition came from two competing companies. This was GM and Tesla. GM did not want to be out done by a startup company so the two companies started a race to create the best electric

car. Status competition also came from creating a small number of high-end electric vehicles that competed with other high-end luxury vehicles [57, 58]. Tesla's sense of urgency strategy was to offer an elite vehicle and then to mass produce more affordable vehicles. Doing this would allow those individuals who could not afford the elite vehicle, but still wanted to have a status symbol by owning a Tesla, could do so. The influx of adoption can be seen in Figure 11 as initially, there was a large amount of Tesla's purchased and individuals were put on a waitlist (1,840 in August 2011). Lastly, Tesla specifically focused their word-of-mouth and advertising techniques on Tesla's high quality. Tesla purposefully put their communication efforts towards showing the high quality of the car rather than focusing on turning a profit. This way, potential consumers would hear about all of the good aspects such as their speed, range, ride, look, and storage space [57]. This would help with the psychological switching costs of potential buyers. All of the see-feel-change, status competitions, word-of-mouth, and advertising techniques listed above are in line with the proposition that using these strategies will create a sense of urgency within consumers.

Proposition 2

Creating a guiding coalition from the innovators to champion the dissemination of information to unaware markets about the product by using idea champions whose personality types are maven, connector, or salesperson will help create early adopters.

The EV1 had a core group of supporters that were strong advocates for the car. They included celebrities (Danny Devito and Ed Begley Jr.), politicians (LA city council member), and a wide array of citizens in California. At the helm of this group were ordinary citizens who focused their time on the adoption of EV1 [44]. The supporters cared deeply about spreading the information about the vehicle and even staged demonstrations to promote information dissemination [44] which is right in line with what mavens do [9]. However, GM did not value their efforts, not to mention creating the guiding coalition from them. In addition, the lack of information on individuals who were at the forefront of the innovation makes it hard to judge if they had the right personality as connectors and salespersons. The failure of EV1 in this way is in support of proposition 2 in that creating a guiding coalition with the right personality types is essential for successful diffusion in the early adopters.

There was similar difficulty in finding personalities within Toyota. When reviewing literature, there is not one person called out as the innovator behind the Prius. Everything references

“Toyota” as the founder of the Prius. Since the company is not a person or group, there is not any way to find if there are mavens, connectors, or salespeople within the innovator group.

Elon Musk, the founder of Tesla, is the salesperson of Tesla’s guiding coalition. His unusual charisma and charm has helped him to persuade individuals and celebrities such as Cameron Diaz, Ben Affleck, Will Smith and others to purchase Tesla vehicles [61]. There are also groups of individuals who make up maven personality within the guiding coalition. There are Tesla groups on Facebook aimed at providing information to one another and other individuals who may be interested in purchasing a Tesla. There are also websites dedicated to electric vehicle advocacy. One such site is called Plug in America [62]. The website aims to spread information on Tesla’s and other plug in cars so supporters can get correct and up to date information. These actions and characteristics are in line with a maven personality [9]. Research into groups or individuals who aim to try to connect individuals or companies together in an effort for marketing and/or growth was conducted, but difficult to find. There were some groups who had Facebook pages or events with many members. The Facebook groups naturally connect individuals together and even potential adopters who are interested in purchasing a Tesla. It could be argued that the Facebook group also serves as the connector of the guiding coalition as well as the maven. Having this guiding coalition in place has helped in the dissemination of information about Tesla and ultimately, its total adoption [9].

Proposition 3

Developing a vision and strategy that is clear and concise and can be easily communicated via every vehicle possible to maintain buy-in from customers will create an increased rate at which early majority adopters will adopt innovations.

GM had a vision and strategy that was imposed upon them by the California Air Resources Board (CARB) rather than having created and initiated one themselves. The Zero Emissions Mandate (ZEM) stated that California carmakers needed to make and sell a certain percentage of ZEM cars by specific dates [44, 63]. After some pushback from GM, the CARB agreed to amend the ZEM to state that these cars only had to be made in accordance with demand [44]. This meant that if there was no demand, that the EV1s would not have to be manufactured. The amendment created misalignment with what the vision the CARB created and what GM was required to produce. This misalignment did not allow for a uniform communication scheme about the product because the same message was not being communicated via every vehicle possible. Therefore, it created a

low knowledge base on the EV1. Random surveys on the streets in California showed that there was a lack of knowledge about electric vehicles [44]. Ultimately, the CARB voted to remove the ZEM mandate [44, 63]. After removal of the mandate in 2000, all of the leased vehicles were pulled from the roads. The decrease from the mandate can be seen in Figure 11 as the adopter curve for EV1s begins drops back to zero after December of 1999.

With Toyota, since they have a global vision that encompasses the entire company. It is broken down into multiple segments to better demonstrate all of the aspects of their vision. Their vision states: “Toyota will lead the way to the future of mobility, enriching lives around the world with the safest and most responsible ways of moving people. Through our commitment to quality, constant innovation and respect for the planet, we aim to exceed expectations and be rewarded with a smile. We will meet challenging goals by engaging the talent and passion of people, who believe there is always a better way.” They communicate this in a lot of different ways; through their website, tours across the country, their actions, etc [64].

In contrast, employees of Tesla communicated by speaking to whomever they needed whenever they needed it. It is something that CEO Elon Musk encouraged in order to combat the slow pace at which information is conveyed [61]. In doing this, it opened more communication channels than which would have commonly existed. Employees were allowed to communicate the vision about Tesla however they wished. Opening these channels helped empower employees to make their own decisions in line with Tesla’s strategy and in so doing, benefited the whole company. With this, Tesla’s vision and their strategy were both clear and concise making it easy to communicate through whichever medium Tesla used. This vision was to create widespread adoption of the electric car and to make the combustion engine obsolete the combustion engine so that an all-electric future can take place [57]. Achieving the vision was done through implementing a three-stage strategy. This strategy was communicated in a wide variety of ways. Some examples include online documents [58], media coverage [57], Tesla’s website [65], and shareholder letters [58]. The following is an outline of Tesla’s three stage strategy.

Stage 1

The first stage was to create a small number of high end cars that prove electric power can be “sexy, fast, and long range”- Elon Musk. This first car is known as the Roadster [57].

Stage 2

The second stage was to create a car that costs half as much and can be sold to a much larger number of consumers because it is more affordable (100K down to less than 50K). The Model S was meant as a premium mass market sedan similar in style to a Roadster so that it was something that people could relate to [57].

Stage 3

The third stage was to create a high volume, economy priced car that is smaller in size and even more affordable, starting at \$35k before incentives. This was known as the Model X. By producing millions of this car, widespread adoption would take place [57].

Communicating the vision and strategy in this way lead consumers to know when the “affordable” Tesla would be released. This release date of the Model S can be seen in Figure 11 between November 2012 and February 2013 as Tesla adopters nearly doubled. As the communication through every means possible continued, the rate of Tesla adoption began to look more exponential than linear. This adoption rate can also be seen in Figure 11. Seeing this increase in adoption along with communicating a vision and strategy through every means possible is in support of proposition 3.

Proposition 4

Empowering broad based action by utilizing the interconnectivity phenomenon will move the product diffusion past the tipping point of early majority into late majority.

GM did not allow adopters to buy the car, but only lease it making it difficult for the interconnectivity phenomenon to take place. Leasing the car meant that GM still owned the EV1s and confiscated them once the ZEM was removed. Since only a small number were manufactured and those were eventually confiscated, there is not any way in which the interconnectivity phenomenon could have taken place [44]. Due to the confiscation, the adopter values declined from their maximum of 1,115 vehicles in December of 1999. The decline in adopter numbers can be seen in Figure 11.

EV1's strategy is in stark contrast to the Toyota Prius and Tesla. It can be seen through correlation studies, that the more Toyota Prius' were sold, the more EVs were sold [66] which is in line with the interconnectivity phenomenon. Having an interconnectivity phenomenon take place allows consumers to adopt more readily as they have the information needed to make an informed adoption decision. The interconnectivity phenomenon can be evident in an exponential

increase in a products' diffusion. For Toyota Prius adoption, the exponential increase can be seen in Figure 11. An exponential increase with using the interconnectivity phenomenon is in line with proposition 4.

Along with this, the more an electric vehicle is sold, the more infrastructure is going to be put in place, and the more consumers will see that an electric car is viable. This is something that Tesla was able to tap into within the interconnectivity phenomenon. Not only did Tesla increase the range of an electric vehicle (300+ miles), Tesla made it possible to charge in a regular 120-volt outlet with the use of a simple adapter [57, 65]. Having this simple plug meant that no additional electrical wiring or circuitry needs to be put into a home to charge a Tesla. In addition, Tesla has created something called a supercharger network as part of their Destination Charging program [58, 65]. These charging stations allow a charge of 170 miles in as little as thirty minutes.

According to [65], "Superchargers enable travel to your favorite destinations and charge Model S and Model X in minutes. Stations have multiple superchargers to get you back on the road quickly and are located near restaurants, shopper centers, and Wi-Fi hotspots." Tesla has created a trip planner for smartphone use that will indicate where charging stations are along the route. [65] has a map noting all of the Tesla charging stations across North America and ones that are opening soon.

By having these pieces in place, the more a Tesla is adopted, the more it enhances its infrastructure and information distribution because electric vehicle accommodations will become more and more available. In November 2012, the supercharger network was launched. When cross-referencing this date with the adopter timeline in Figure 11, the amount of Tesla adopters almost doubled in 5 months. November 2012 also corresponds to the beginning of an exponential increase in Tesla adopters. The exponential increase in adopters using the interconnectivity phenomenon is in line with proposition 4.

Proposition 5

Generating short term wins through incentivizing and see-feel-change strategies will lead to an increased rate of late majority adopters.

During the time of the EV1, there were some small incentives for adopting an electric vehicle. There was a maximum of a \$2,000 tax incentive, but other vehicles in the market happened to have a much higher leasing incentive. Along with this, no see-feel-change strategies were used to demonstrate wins amongst adopters and potential adopters. In fact, no wins were even recognized by GM. Such wins that could have been celebrated would have been the 4,000 person waiting list

or the addition of EV charging stations throughout LA [44].

The EV1, Toyota, and Tesla all used incentives to create short-term wins. However, the difference between the EV1 strategy and Toyota and Tesla's strategies is the involvement of see-feel-change strategies when creating these wins. Toyota was able to implement see-feel-change in creating short-term wins at the gas pump. Each time a Prius driver goes to fuel, they see the difference in cost through increased miles per gallon (MPG), and this creates a small emotional response during each fuel-up. Using the see-feel-change in this way instigates an immediate emotional response and keeps individuals motivated to stay with the change [15]. Keeping motivated means that consumers will continue to adopt the Prius. This continued increase in Prius consumers can be seen in Figure 11 and is in support of proposition 5.

Tesla's see-feel-change strategies were different than Toyota's, but it still fell in line with the premise of why see-feel-change strategies work. Tesla hosted (and still does host) test drive events where potential customers could see and touch the car as well as take it for a test drive. Along with focusing on potential customers, Tesla also concentrated on creating short-term wins for current customers who had not received their Tesla vehicle yet as it was still in production. The reason Tesla focused on existing customers is that they did not want to lose their buy-in. Tesla consumers who were waiting for their vehicles were given a number and that number corresponded to the number vehicle that came off of the Tesla manufacturing line. It helped customers to feel special, and it attached them to their cars from the very beginning of production. It also allowed consumers to see their cars and know exactly where their cars sat in production. Lastly, a onetime tax incentive has been given to any consumer who purchased a Tesla [57]. Continuing these short term wins leads to increases in consumers of the Tesla. This continued increase can be seen in Figure 11 and is in support of proposition 5.

4.3 Summary

With social networks and electric vehicles, both cases had failures followed by successes. With social networks, Friendster did not follow the suggestions made in the propositions and their innovation failed. With MySpace and Facebook, these companies did follow the propositions and both companies have had successful innovations. Table 5 summarizes which of the social networking cases verify the propositions. Figure 10 shows the member quantities of these social networking sites in regards to time.

Electric vehicles also had an initial failure of an innovation into the market followed by successes. In the cases of the electric vehicle, there was an initial failure followed by multiple

successes. In the instance of the EV1, GM did things differently than what the propositions suggested and subsequently, EV1's failed. In stark contrast to this was the Toyota Prius and Tesla. They followed the propositions and as such, have been successful in their innovations. Figure 11 is a graphical representation of the electric vehicle consumer adoptions of EV1's, Prius's, and Tesla's over time where Table 5 summarizes which of the electric vehicle cases verify the propositions. In Figure 11, proposition 2 is not listed due to insufficient data to support the proposition. Also, since the electric vehicles have not reached the point where they become "norms", proposition 6 and 7 were not explored. However, it is suggested that Toyota and Tesla follow these propositions to carry the diffusion through.

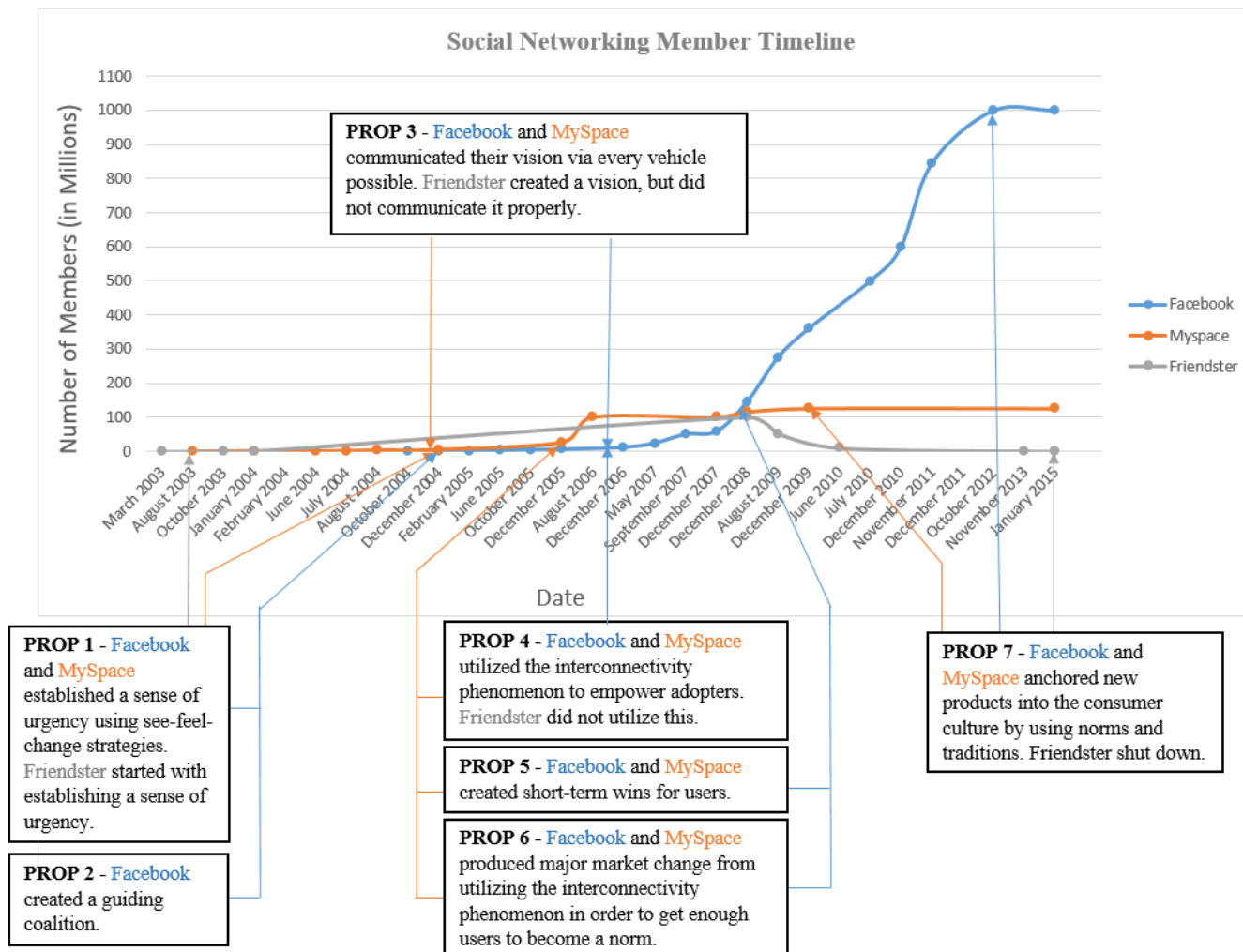


Figure 10 - Member Timeline for Social Media with Propositions [43, 47, 49-51, 67, 68]

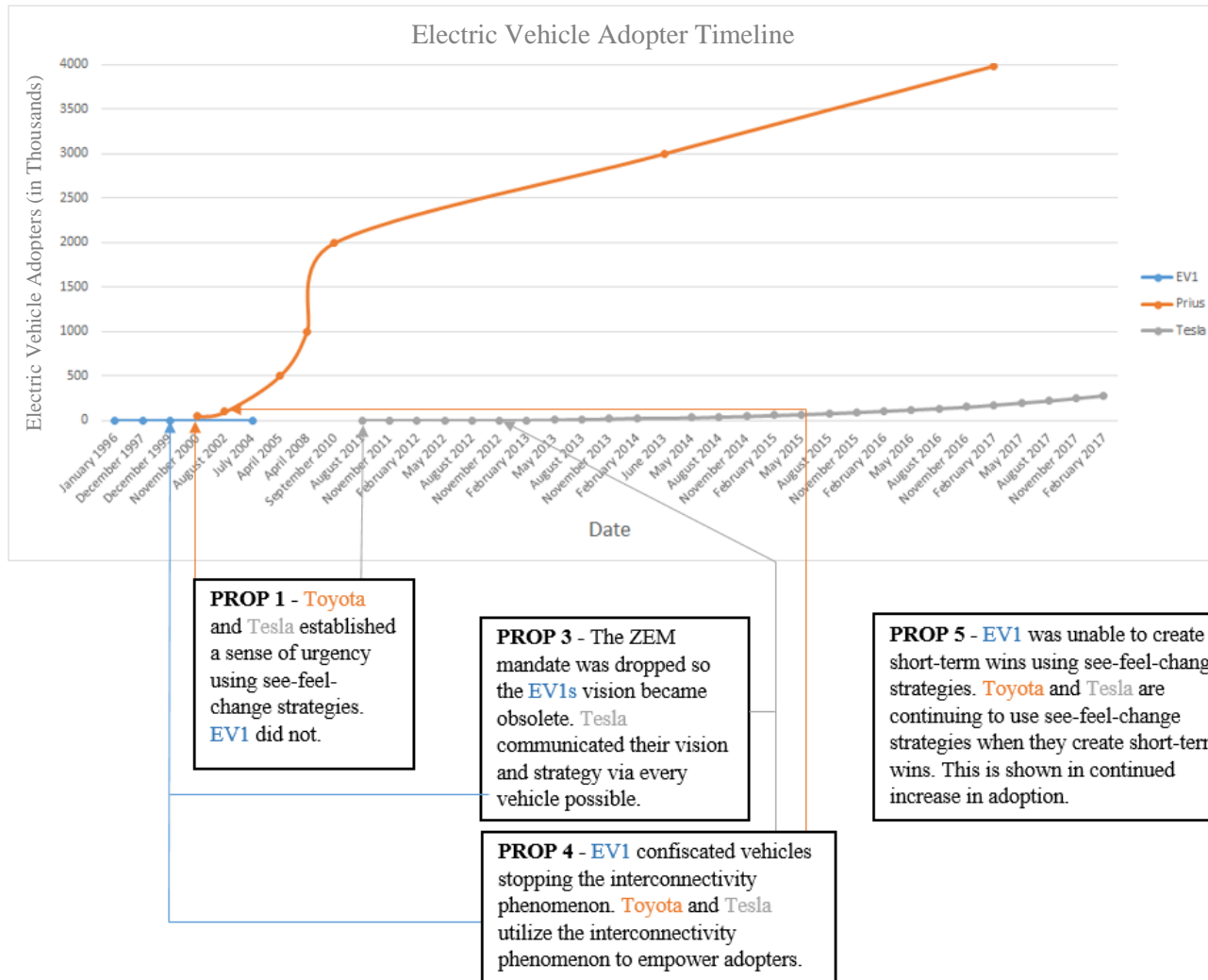


Figure 11 - Adopter Timeline for Electric Vehicles with Propositions [44, 57, 58, 69-71]

As can be seen in Figures 10 and 11, the propositions that focused on the beginning stages of adoption to increase overall adoption rates helped to start exponential increases in diffusion. The propositions that focused on establishing norms based upon total adopter numbers occurred as the adoption rates started to level off. Seeing that the propositions fall in line with exponential increases as well as establishing this dominance by having so many adopters so social norms were created is all in support of Propositions 1 - 7.

It should be noted that for case 2 (as stated earlier) propositions 6 and 7 were not evaluated. This is because electrical vehicles do not have enough product to saturate the market and subsequently are not to the point where they are social norms. Also as stated earlier, it is suggested that Toyota and Tesla follow these propositions to carry the diffusion through.

	Case 1			Case 2		
	Friendster*	MySpace	Facebook	EVI*	Toyota Prius	Tesla
Proposition 1	√	√	√	√	√	√
Proposition 2	√	√	√	√		√
Proposition 3	√	√	√	√	√	√
Proposition 4	√	√	√	√	√	√
Proposition 5	√	√	√	√	√	√
Proposition 6	√	√	√			
Proposition 7	√	√	√			

Table 5 - Case Studies that Verify Propositions

*These are cases where failure of the diffusion of innovation in the market act as support of the proposition.

5.0 Conclusions

In this thesis, literature on innovation diffusion, personality and buyer psychology, and change management was reviewed, and a research gap on using change management techniques to influence innovation diffusion was identified. As a result, seven propositions on connecting change management techniques with innovation adopter types were derived and validated using case studies on the diffusion of social networks and electric vehicles. Literature stresses the importance of understanding consumers' fear of change when faced with adoption decisions of innovations. Through the case studies, the effectiveness of using change management techniques is shown to help potential consumers overcome such fear and better encourage adoption.

Utilizing change management techniques, which are traditionally found in organizations, and applying them to companies' strategies to alter individual consumers' behavior will promote the diffusions of innovations. In the case studies, the companies that followed the change management techniques in promoting their innovations had much higher overall diffusion and also outlasted companies that had similar innovations but failed to follow the suggested propositions. This advocates that change management in innovation adoption can have a dramatic impact on new product diffusion.

Utilizing change management concepts and techniques, companies can promote the successful diffusion of their innovations by influencing potential consumers' fear of change. The series of seven steps that were identified from this work can be used as innovation change management techniques. The steps are as follows:

STEP 1 - Create a sense of urgency in adopters by implementing see-feel-change strategies, status competitions, and marketing/advertising techniques.

STEP 2 - Create a guiding coalition made with individuals who have the three following personality types: mavens, connectors, and salespeople.

STEP 3 - Develop a vision and strategy that is clear and concise. Communicate this via every vehicle possible and stay true to it throughout the change process.

STEP 4 - Plan for and use the interconnectivity phenomenon.

STEP 5 - Plan for and generate short-term wins through incentivizing and see-feel-change techniques.

STEP 6 - Plan for and generate social norms by recognizing when the interconnectivity phenomenon can be used.

STEP 7 - Anchor the innovation into society by acknowledging and helping to promote the innovation as a social norm and new tradition.

Without keeping up with the demands in the age of acceleration, companies will be left behind. Rather than being reactive to change, these seven steps outline a way for companies to be proactive and harness the information provided in change management research to push innovations forward into markets. This unique research is important in innovation adoption because it provides a pathway that is necessary for innovation managers to use so they can positively and dramatically impact innovation diffusion by influencing change resistance. This positive impact will affect an organizations bottom line, and therefore, help to decrease the alarmingly high failure rate of innovations.

This work made contributions to the body of knowledge in innovation diffusion. Like with any research, there are limitations too. The diffusion of any innovation is a complex process. It involves multiple factors and multiple players that are intertwined and interact with one another. Many factors such as competition, diffusion media, price strategies, etc. were not included in the analysis when validating the propositions. Also, since the diffusion of the electric vehicles is still at its early stage of diffusion, propositions 6 and 7 were not tested. Future studies can explore these items when data becomes available or using more case studies. As stated earlier, there are many other factors involved in the new product adoption process. Future studies can also look into how the proposed change management techniques can be more effectively implemented together with other strategies suggested in literature for successful product adoption and innovation diffusion.

Bibliography

- [1] N. Patel. *90% of startups fail: here's what you need to know about the 10%*. *Forbes.com*. 2015. [Online]. Available: <https://www.forbes.com/sites/neilpatel/2015/01/16/90-of-startups-will-fail-heres-what-you-need-to-know-about-the-10/#2b1d04a86679>. [Accessed December 2017].
- [2] E. M. Rogers, *Diffusion Of Innovations*. New York: New York : Free Press of Glencoe, 1962.
- [3] F. Bass, "A new product growth for model consumer durables," *Management Science*, vol. 50, no. 12_supplement, pp. 1825-1832, 2004.
- [4] S. E. Pammer, D. K. H. Fong, and S. F. Arnold, "Forecasting the penetration of a new product—a bayesian approach," *Journal of Business & Economic Statistics*, vol. 18, no. 4, pp. 428-435, 2000.
- [5] H. Chen, J. Yu, and W. Wakeland, "Generating technology development paths to the desired future through system dynamics modeling and simulation," *Futures*, vol. 81, pp. 81-97, 2016/08/01/ 2016.
- [6] G. M. Schmidt and C. T. Druehl, "Changes in product attributes and costs as drivers of new product diffusion and substitution," *Production and Operations Management*, vol. 14, no. 3, pp. 272-285, 2005.
- [7] F. M. Bass, "DIRECTV: forecasting diffusion of a new technology prior to product launch," *Interfaces*, vol. 31, no. 3_supplement, pp. S82-S93, 2001.
- [8] N. Meade and T. Islam, "Modelling and forecasting the diffusion of innovation – A 25-year review," *International Journal of Forecasting*, vol. 22, no. 3, pp. 519-545, 2006/01/01/ 2006.
- [9] M. Gladwell, *The Tipping Point : How Little Things Can Make A Big Difference*, 1st ed.. ed. Boston: Boston : Little, Brown, 2000.
- [10] M. G. Nejad, D. L. Sherrell, and E. Babakus, "Influentials and influence mechanisms in new product diffusion: an integrative review," *Journal of Marketing Theory and Practice*, vol. 22, no. 2, pp. 185-208, 2014.
- [11] S. Mansori, M. Sambasivan, and S. Md-Sidin, "Acceptance of novel products: the role of religiosity, ethnicity and values," *Marketing Intelligence & Planning*, vol. 33, no. 1, pp. 39-66, 2015.
- [12] S. Schwartz, *Basic human values: Theory, measurement, and applications*. 2006, pp. 929-968+977+981.
- [13] K. Kehoe, "Be different: keep your word: so much of the sales process has little to do with the greatness of the design; it has much more to do with the psychology of the buyer." *Landscape Management*, vol. 47, no. 11, p. 40, 2008.
- [14] J. T. Gourville and H. U. H. B. School, "Why Consumers Don't Buy: The Psychology of New Product Adoption," ed: Harvard Business School Pub., 2003.
- [15] J. P. Kotter, *Leading Change*. Boston, Mass.: Harvard Business School Press, 1996.
- [16] J. P. Kotter, *The Heart of Change : Real-life Stories of How People Change Their Organizations*. Boston, Mass.: Boston, Mass. : Harvard Business School Press, 2002.
- [17] S. Kahan, *Getting Change Right: How Leaders Transform Organizations From The Inside Out*. San Francisco, CA: Jossey-Bass, 2010.
- [18] S. Boncu, "The complexity of social norms," *Psihologia Sociala*, no. 34, pp. 133-134, 2014.
- [19] J. Kotter. *The key to changing organizational culture*. *Forbes.com*. September 27, 2012. [Online]. Available: <https://www.forbes.com/sites/johnkotter/2012/09/27/the-key-to-changing-organizational-culture/#7901c49b5509>. [Accessed January 2017].

- [20] M. Vakola, I. Tsaousis, and I. Nikolaou, "The role of emotional intelligence and personality variables on attitudes toward organisational change," *Journal of Managerial Psychology*, vol. 19, no. 2, pp. 88-110, 2004.
- [21] C. Wittig, "Employees' reactions to organizational change," *OD Practitioner*, vol. 44, no. 2, 2012.
- [22] W. H. Redmond, "Interconnectivity in diffusion of innovations and market competition," *Journal of Business Research*, vol. 57, no. 11, pp. 1295-1302, 2004.
- [23] G. Weimann, *The Influentials : People Who Influence People*. Accessed from <https://nla.gov.au/nla.cat-vn449233>). Albany: State University of New York Press, 1994.
- [24] D. J. Watts and J. Peretti, "Viral marketing for the real world.(Forethought)," *Harvard Business Review*, vol. 85, no. 5, p. 22, 2007.
- [25] B. Kamrad, S. S. Lele, A. Siddique, and R. J. Thomas, "Innovation diffusion uncertainty, advertising and pricing policies," *European Journal of Operational Research*, vol. 164, no. 3, pp. 829-850, 2005.
- [26] A. LaFreniere, "Buyer psychology, consumer confidence: how to post sales in today's marketplace.," *Professional Builder and Remodeler*, vol. 56, no. 8, p. 12, 1991.
- [27] S. Sinek, *Start With Why: How Great Leaders Inspire Everyone to Take Action*. New York, NY: Portfolio, 2009.
- [28] D. Martin and A. Woodside, "Learning consumer behavior using marketing anthropology methods," vol. 74, ed, 2017, pp. 110-112.
- [29] S. Godin, *Tribes: We Need You to Lead Us*. New York: New York : Portfolio, 2008.
- [30] T. A. Knight, A. J. Richert, and C. R. Brownfield, "Conceiving change: lay accounts of the human change process," *Journal of Psychotherapy Integration*, vol. 22, no. 3, pp. 229-254, 2012.
- [31] S. B. Sarason, "Toward a psychology of change and innovation," *American Psychologist*, vol. 22, no. 3, pp. 227-233, 1967.
- [32] K. J. Reynolds and N. R. Branscombe, *Psychology of Change: Life Contexts, Experiences, and Identities*. New York, New York: Taylor & Francis, 2014.
- [33] C. Heath, *Switch: How To Change Things When Change Is Hard*, 1st ed.. ed. New York, New York: Broadway Books, 2010.
- [34] A. Ellis, "The revised ABC's of rational-emotive therapy (RET)," *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, vol. 9, no. 3, pp. 139-172, 1991.
- [35] D. Carnegie, *How to Win Friends and Influence People*. New York, New York: Simon and Schuster, 1937.
- [36] E. Kübler-Ross, *On Death and Dying*. New York, New York: Macmillan, 1969.
- [37] V. Hoffmann, K. Probst, and A. Christinck, "Farmers and researchers: how can collaborative advantages be created in participatory research and technology development?," *Agriculture and Human Values*, vol. 24, pp. 355-368, 2007.
- [38] T. Wani and S. Ali, "Innovation diffusion theory review and scope in the study of adoption of smartphones in India," *Journal of General Management Research*, vol. 3, pp. 101-118, 2015.
- [39] Study.com, "Classes of Adopters: Innovators, Early, Late and Laggards," ed, 2018.
- [40] G. A. Moore, *Crossing the Chasm: Marketing and Selling High-tech Products to Mainstream Customers*. New York, New York: HarperBusiness, 1999.
- [41] L. F. Feick and L. L. Price, "The market maven: a diffuser of marketplace information. (persons who share market information with other consumers)," *Journal of Marketing*, vol. 51, no. 1, p. 83, 1987.
- [42] 2018. [Online]. Available: <https://MySpace.com/pressroom/pressreleases>. [Accessed February 2018]
- [43] Unknown. 2018. [Online]. Available: <https://newsroom.fb.com/company-info/>. [Accessed February 2018]

- [44] C. Paine, "Who Killed the Electric Car?," ed. Electric Entertainment, Sony Pictures Classics, 2006.
- [45] NASDAQ *nasdaq.com*. 2018. [Online]. Available: <https://www.nasdaq.com/symbol/tsla/interactive-chart>. [Accessed March 2018].
- [46] K. Seki and M. Nakamura, "The mechanism of collapse of the Friendster network: What can we learn from the core structure of Friendster?," *Social Network Analysis and Mining*, vol. 7, no. 1, pp. 1-21, 2017.
- [47] J. Angwin, *Stealing MySpace: The Battle to Control the Most Popular Website in America*, 1st ed.. ed. New York, New York: Random House, 2009.
- [48] *Then and now: a history of social networking sites*. CBS News. 2018. [Online]. Available: <https://www.cbsnews.com/pictures/then-and-now-a-history-of-social-networking-sites/4/>. [Accessed February 2012].
- [49] A. Ventures. *Chris DeWolfe*. 2009. [Online]. Available: <http://www.austinventures.com/team/entrepreneurs/chris-dewolf>. [Accessed February 2018].
- [50] D. Kirkpatrick, *The Facebook Effect: The Inside Story Of The Company That Is Connecting the World*. New York, New York: Simon & Schuster, 2011.
- [51] D. Garcia, P. Mavrodiev, and F. Schweitzer, "Social resilience in online communities: the autopsy of friendster," *ACM*, pp. 39-50, 2013.
- [52] J. Heilemann, "What's Friendster selling? ," *Business 2.0*, vol. 5, no. 2, p. 46, 2004.
- [53] (2018). Available: dictionary.com. [Accessed January 2018]
- [54] Unknown. 1996. AQMD. [Online] Available: <http://www.aqmd.gov/home/research/publications/smog-and-health-historical-info>. [Accessed February 2018].
- [55] T. Watkins. *The true story of GM's electric car of the 1990's, the EV1*. [Online]. Available: <http://www.sjsu.edu/faculty/watkins/electriccar.htm>. [Accessed September 2017]
- [56] Unknown. *Development of prius and hybrid strategy*. Toyota.com. 2012. [Online]. Available: http://www.toyota-global.com/company/history_of_toyota/75years/text/leaping_forward_as_a_global_corporation/chapter4/section8/item1_a.html. [Accessed October 2017]
- [57] C. Pain, "Revenge of the Electric Car," ed. Tribeca Film Festival, 2011.
- [58] E. Musk. *Tesla.com*. 2011-2017. [Online]. Available: <http://ir.tesla.com/results.cfm>. [Accessed January 2018].
- [59] CCCmarketing, "Toyota Prius The Power of Excellence in Product Innovation and Marketing," ed. YouTube, 2012.
- [60] R. Halbright. *Prius Marketing Case Study*. 2012. [Online]. Available: http://www.maxdunn.com/storage/www.maxdunn.com/PMBA:%20Presidio%20MBA%20Home/Prius_Marketing_Case_Study.pdf. [Accessed October 2017].
- [61] D. Smith. *18 celebrities who drive Tesla cars*. Business Insider. 2016. [Online]. Available: <http://www.businessinsider.com/18-celebrities-who-drive-tesla-cars-2016-3#will-smith-drives-a-model-s-3>. [Accessed March 2018].
- [62] (2018). Available: <https://pluginamerica.org/>. [Accessed March 2018].
- [63] S. Shaheen, "California's zero-emission vehicle mandate," *Transportation Research Record* 1791, no. 02-3857, 2002.
- [64] Unknown. http://www.toyota-global.com/company/vision_philosophy/toyota_global_vision_2020.html . 2018. [Online]. Accessed December 2017.
- [65] (2018). *Tesla.com*. Available: <www.tesla.com>. [Accessed Decemeber 2017].

- [66] G. Heutel and E. Muehlegger, "Consumer learning and hybrid vehicle adoption," *Environmental and Resource Economics*, journal article vol. 62, no. 1, pp. 125-161, September 01 2015.
- [67] R. Kerr. (2011). *MySpace history: A brief walk down memory lane. 2011. [Online]*. Available: <http://vator.tv/news/2011-06-30-the-brief-rise-of-myspace-and-its-long-slow-demise>. [Accessed February 2018].
- [68] S. Bennett. *A brief history of 7 social networks (and how they used to look)*. 2013. [Online]. Available: <http://www.adweek.com/digital/social-networks-early-history/>. [Accessed January 2018].
- [69] O. Edwards. (2006). *The Death of the EV-1. 2006. [Online]*. Available: <https://www.smithsonianmag.com/science-nature/the-death-of-the-ev-1-118595941/>. [Accessed January 2018].
- [70] Unknown. *GM, Chevron and CARB killed the sole NiMH EV once, will do so again*. 2016. [Online]. Available: <http://www.ev1.org/>. [Accessed March 2018].
- [71] Unknown. *Worldwide sales of Toyota hybrids surpass 10 million units*. Toyota. 2017. [Online]. Available: <https://newsroom.toyota.co.jp/en/detail/14940871>. [Accessed March 2018].