“ROLE OF SOCIAL MEDIA IN CREATING AWARENESS ON CLIMATE CHANGE: “TESTING THE KAP MODEL IN SUKKUR”

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This thesis is submitted to the Department of Media and Communication Studies, Faculty of Social Sciences, International Islamic University, Islamabad to fulfill the requirements for degree of MS (Media and Communication Studies).

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DEDICATION

Researcher dedicates his dissertation work to his family and friends. A special feeling of gratitude to his loving parents, his brothers and sisters who have never left him alone and they are very special to him.

Researcher also dedicates this dissertation to his friends and his university fellows who have supported him throughout the process. He will always appreciate all they have done for him.

Researcher gives special thanks to his supervisor Dr. Muhammad Zafar Iqbal for being there for him throughout the entire MS program. Researcher thanks his supervisor for being so cooperative to him. Supervisor has been his best teacher throughout his MS journey.

FORWARDING SHEET

This thesis entitled "**ROLE OF SOCIAL MEDIA IN CREATING AWARENESS ON CLIMATE CHANGE: "TESTING THE KAP MODEL IN SUKKUR**", submitted by **SHAFQUATALI Registration # 496- FSS.MSMC/F21** to fulfill the partial requirements, for the award of degree of MS (Master Studies) in Media and Communication Studies, under my guidance and Supervision is forwarded for the further necessary action.

THESIS COMPLETION CERTIFICATE

This thesis entitled **"ROLE OF SOCIAL MEDIA IN CREATING AWARENESS ON CLIMATE CHANGE: "TESTING THE KAP MODEL IN SUKKUR"**, submitted by **SHAFQUAT ALI** Registration #496- FSS.MSMC/F21 in partial fulfillment for the requirement of MS Media and Communication Studies has been completed under our guidance and supervision. We are satisfied with the quality of student research work and allow him to submit this thesis for further process as per IIUI rules and regulations.

STATEMENT OF UNDERSTANDING

The researcher "**Shafquat Ali**" having registration number 496- FSS/MSMC/F21/F21 and student of MS Media Communication Studies, Faculty of Social Sciences, International Islamic University Islamabad do declare that thesis entitled "**ROLE OF SOCIAL MEDIA IN CREATING AWARENESS ON CLIMATE CHANGE: "TESTING THE KAP MODEL IN SUKKUR**" submitted by me in specific satisfaction of MS degree in the original work except other acknowledgement of text has not been submitted or published earlier nor in future be submitted by me for any degree from this university or institution.

DATE: _____ Signature: _____

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ABSTRACT

The purpose of this in-depth study was to investigate the efficacy of social media initiatives in terms of increasing knowledge and molding attitudes on climate change among people living in the Sukkur district. The study employed quantitative surveys to gain a comprehensive understanding of the issue. Data was collected from a diverse sample of participants, ensuring representation across various demographic factors. The purpose of this study was to analyze the influence that these campaigns have had on knowledge, attitudes, and practices (KAP) by conducting a thorough examination of demographic factors, patterns of social media usage, and perceptions regarding climate change. The findings demonstrated the enormous influence that social media has in raising information and creating positive attitudes about climate change. However, they also highlight a notable gap between awareness and action about climate change. The incorporation of interactive and engaging material, the personalization and localization of messages, and the promotion of community interaction are some of the strategic recommendations that have been made to improve the efficacy of the campaign. The findings of statistical studies indicate that there are relationships between the use of social media, interaction with climate content, and KAP dimensions. These findings highlight the significance of tailoring content strategies and engaging in activities that are specifically targeted. Comparative studies have shown that YouTube is particularly effective in the distribution of knowledge, Instagram and YouTube are both effective in the shaping of attitudes, and YouTube is specifically effective in encouraging the adoption of practices. Optimizing the impact of a campaign can be accomplished by exploiting the strengths of various platforms, such as YouTube for education and Instagram for attitude shaping. This is one of the strategic implications for campaign design. Taking everything into consideration, this study offers a wealth of useful insights and suggestions for the development of effective social media campaigns pertaining to climate change communication.

Keywords: Keywords, Social Media, Climate Change, Knowledge, Attitudes Practices (KAP), Sukkur District

CHAPTER 1

1.0 Introduction

1.1. Background of the Study

Warming of the Earth's average surface temperature over time is known as global warming (Ruela,2020). Aside from endangering the lives of individuals, this phenomenon also threatens the health of Earth's ecosystems (Chen, 2022). This is a major concern as all credible scientific organizations have come to the same conclusion: human activities are a major contributor to the acceleration of climate change (Wielke,2020). The consensus among scientists provides conclusive evidence of this. The importance of social media in raising consciousness and coordinating collective action is becoming more apparent (William,2023). This acknowledgement is timely because addressing climate change problems is becoming increasingly critical (Opoku,2021). The presence of this revolutionary component is absolutely critical for enabling the quick dissemination of vital information and raising global awareness of the environmental disasters that are happening right now (Papa,2021). Climate change, on the other hand, is the biggest environmental concern right now. This has started to show up in the form of more and more extreme weather events as a result of the average global temperature rising. Furthermore, numerous other environmental concerns have recently come to light, and immediate action is required to mitigate their impact (Beillouin,2020). It seems like there is no clear solution, despite the fact that several concerned organizations have worked on it, including the IPCC and the UN Framework Convention on Climate. This is because prioritizing either the environment or the economy becomes an impossible choice when confronted with environmental challenges (Blanchard,2021). Cleaner air and water are the results of less economic activity, and vice

versa. Furthermore, most nations have remained focused on high-revenue economic activity due to the attractiveness of attaining a high Gross Domestic Product (GDP) (Almaqtari,2023). This means that Earth's environmental issues will remain a mystery for the foreseeable future. The complex and interconnected nature of climate change presents communities with a formidable challenge; social media platforms not only reflect public sentiment but also shape narratives. Reason being, social media not only shows but also shapes people's emotions and narratives (Constantino,2021). More educated discussions regarding ecologically responsible actions are encouraged, and people are encouraged to feel a stronger sense of responsibility as a result. The interconnected nature of social media's influence and the critical need to combat climate change is an intriguing topic that necessitates immediate and extensive study. There has to be extensive research on this subject (Mahmud,2020).

1.1.1. Environmental Issues on a Global Scale

Alarming signs of climate change, such as increasing temperatures, melting ice caps, and severe weather events, drove a surge in environmental consciousness in the late 20th and early 21st centuries (Levine,2021). Because of this newfound consciousness, environmental discussions have shifted to place more emphasis on the importance of sustainable practices and a united international response (Crace,2021). Weather patterns, both on average and in relation to one another (i.e., extreme weather occurrences), can undergo statistical changes over extended periods of time, which are collectively known as climate change (Walsh,2020). There has been much debate over what exactly is causing climate change, but everyone agrees that it is happening and that humans are playing a significant part (IPCC, 2007). During the twentieth century, the average surface temperature of the Earth rose by 0.74 degrees Celsius, the rate of sea level rise has been 1.8 millimeters

per year since 1961, and the rate of sea ice melting in the Arctic has been 2.7% each decade, according to the European Environment Agency (EEA, 2008) (Jamieson,2020). More frequent and severe weather events are happening, oceans are more acidic, and mountain glaciers are shrinking. Heat waves, floods, and droughts, among other extreme weather phenomena, are expected to become more often in the 21st century, according to the IPCC (2001). The average global temperature is also forecast to rise by 1.5 to 5.8°C. One of the greatest challenges facing human society is finding a way to respond to global changes while also seeking sustainable growth. In spite of climatic variability uncertainties, the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2013) determined a "likely range" of 0.3 °C to 4.8 °C for the increase of the world average surface temperature by 2100. By 2050, the world's population is projected to reach 9.6 billion, and by 2100, it's projected to reach 11.2 billion (UN, 2017). With a 33% rise in the population, the greenhouse effect and, by extension, global warming, will be exacerbated in a roundabout way (Downing, 2017). The effects of climate change are becoming more apparent in Europe and around the world. One notable issue is the persistence of a mean global temperature that is around 0.8°C higher than the level observed before industrialization. Increase, particularly across Europe (see, for example, the European Environment Agency (2012). Natural processes, precipitation patterns, glacier melting, sea level rise, etc. are all impacted by climate change, which is a global phenomenon. It is important to think about the effects of climate change and the repercussions in the next decades, regardless of the forecasts for warming and the effectiveness of mitigation strategies (Croce, 2018). More than 150 nations signed the United Nations Framework Convention on Climate Change in 1992 at the Earth Summit in Rio de Janeiro, pledging to take action to prevent catastrophic man-made impacts on the world's climate (Morin, 2020).

Following more talks, the Kyoto Protocol was agreed upon in 1997. As part of it, several industrialized nations made a legally binding pledge to decrease their emissions of a basket of the main greenhouse gases (Smith, 2011). International policymakers have been focused on climate change for a long time because it is a really global problem (Albert, 2022). Climate is influenced by a myriad of factors, including but not limited to: temperature, wind speed and direction, precipitation, latitude, and longitude, as well as the planetary rotation and revolutions (O'Rourke, 2023). All humans and, more broadly, all form of life on Earth share this. Gases with heat-trapping characteristics, such as carbon monoxide, carbon dioxide, and oxides of nitrogen, are produced on a vast scale as a result of human industrial activity, primarily the combustion of fossil fuels. These create a protective barrier in the stratosphere (Soeder, 2022). The planet now takes in some of the sun's heat, which it then either absorbs or reflects back into space (Mishra, 2022 & Dubey, 2023). This quantity would typically be reflected back, but these gases make it much less. Here we have the Greenhouse Effect in action. Consequently, the average world temperature rises (Abernethy, 2021 & Jackson, 2022). According to estimates, the world's temperature has increased by almost 1.5 degrees Celsius during the past 200 years (Bhattacharya, 2016).

1.1.2. Climate Change's Worsening Effects

Rising temperatures are having a devastating effect on Earth's ecosystems, which in turn are having a domino effect on many other areas of the environment (Romanello, 2021). Sea levels are rising rapidly due to the melting of polar ice caps and glaciers, which is a direct danger to low-lying areas and coastal towns as a result of the increase in global temperatures (Freestone, 2022 & Çiçek, 2023). Extreme weather events become more common and more destructive as a result of this flooding, making life even more difficult for already vulnerable communities (Clarke, 2021). Concurrently, ecosystems are facing

increasing challenges in adapting to the changing climate, which is causing disturbances in biodiversity (Turner, 2022). Many plant and animal species have declined as a result of ecosystem disruptions caused by things like habitat loss, altered migration patterns, and invading species growth (Biswas, & Sarkar, 2022). The complex web of relationships between different species in an ecosystem highlights how these disturbances can have far-reaching effects, affecting human communities who rely on these ecosystems for survival (Albery, 2021). There is a growing sense of urgency to tackle the effects of climate change as more and more scientific information accumulates (Paterson, 2020). The ice caps melting, the seas rising, the frequency and severity of extreme weather events, and the decline in biodiversity are clear signs of the human impact on Earth's climatic systems (Pörtner, 2022). A compelling case for concerted action arises from this growing corpus of evidence (Pang, & Woo, 2020). The urgent and coordinated action to lessen the effects of climate change has been brought to light by the scientific community's thorough evaluations and investigations, which have confirmed the phenomenon (Freschi, 2023). The importance of this awareness cannot be overstated; it goes beyond mere policy shifts and global accords (Erforth, 2020). Addressing climate change requires a significant cultural change in perspective and behavior, which is increasingly acknowledged, but legislative and policy frameworks are essential (Mehryar, &Surminski, 2021). It is necessary to take a comprehensive strategy because environmental, social, and economic systems are all interdependent. For this change to occur, it is essential that people are not just educated, but also that we all work together to adopt more environmentally friendly habits and take greater care of our world (Zerinou, 2020). Overall, the growing severity of climate change is a stark warning that we can't just modify policies in response to this international crisis (Rohling, 2022). It begs for a radical shift in society, where people realize how serious it is, start living sustainably, and fight for

structural changes that put the planet's health and resilience first, for the benefit of present and future generations (Lueddeke, 2020)**.** Several health consequences are exacerbated by high temperatures. There is evidence that they raise the rates of suicidal thoughts, psychological discomfort, and mental health hospitalizations (House, 2023). Problems, as well as negatively impacting physical and mental health, leading to an increase in mortality rates for those who fulfill the criteria for mental illness. Extreme heat and heat waves have many unfavorable social effects and heightened dangers, some of which may affect people's mental health (Conti, 2022). There will be less economic production, more conflict, more societal violence, and interrupted sleep, among other things (Zvolensky, 2020). Temperature changes can cause physiological changes, such as effects on the central nervous system and blood flow, which can cause changes in cognition and mood, which can have a detrimental effect on mental health and emotional well-being (Simon, 2021). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) issued a worldwide report in 2019 stating that approximately one million species of plants and animals are in danger of extinction, and that biodiversity "is declining faster than at any time inhuman history (Marques, 2019 & Marques, L. 2020)." Some have pointed to changes in land and marine use as well as pollution as causes for this reduction, but climate change has been named as the primary culprit (Sovacool, 2021). As a result of the decrease in macro variety, micro diversity is also declining. "The biodiversity hypothesis" posits that the microbiota and its immunomodulatory potential may be negatively impacted by less human interaction with a naturally diverse environment (Sarubbo, 2022)."Biodiversity loss leads to reduced interaction between environmental and human microbiotas, which in turn may lead to immune dysfunction and impaired tolerance mechanisms (Álvarez, 2021)." This hypothesis has the backing of many in the scientific community, including the World

Allergy Organization (WAO) (Annesi-Maesano, 2021). According to the WAOJ's statement, these alterations could be responsible, at least in part, for the rise in inflammatory diseases, allergies, and asthma in industrialized nations (Biagioni, 2020).

1.1.3. The Widespread Nature of Social Media Sites

The widespread use of social media has ushered in a new age in human communication, drastically changing the ways people all over the world interact, share, and absorb news and other information (Chomsky, & Pollin, 2020) . Social media and video sharing websites like YouTube, Instagram, and Twitter mark more than just technical progress; they herald a sea change in the way people communicate and share ideas (Ncube, 2023). Social media platforms have become an integral part of modern life online, bridging generations and continents to bring together people from all over the world (Anwar, & Graham, 2022). People from all walks of life converge on these platforms to share and discuss ideas, opinions, and experiences; they're like online town squares (Gómez, &Lebrusán, 2022). When it comes to society conversation, action, and even the formation of political landscapes, the ubiquitous impact of social media goes well beyond personal connection (Granic, 2020). One of the main reasons why these platforms are everywhere being because of how easy they are to use (Heeks, 2020). Users may create and consume content with unparalleled simplicity as they navigate intricate digital ecosystems with a simple tap or click (Sgueo, 2023). Social media platforms' user-friendly layouts make them accessible to anyone with different levels of technical expertise, leveling the playing field online and making sure that everyone with an internet connection may join in on the worldwide discussion (Tyagi, 2020). Furthermore, social media's round-the-clock availability eliminates limitations imposed by time zones and more conventional forms of communication (Bocchino, 2022). This always-on connection allows for the rapid spread of

information and also promotes interaction in real-time (Zhang, 2022). An ever-changing information ecology reflecting the pulse of modern society is created by the rapid propagation of news, ideas, and cultural trends through the complex web of social media (Guo, 2020). In addition to facilitating contact, social media platforms are powerful vehicles for the spread of information and the exertion of social influence. In a mutually beneficial connection that influences stories and societal dialogue, users take on the roles of producers, curators, and consumers of material (Bide, 2021). Because of how quickly and widely shared content on these platforms may spread, they are potent forces for positive social change (Nielsen, & Fletcher, 2020). A cultural revolution in human connection, sharing, and engagement with information is embodied by the ubiquitous nature of social media platforms, which goes beyond their technical features (Olsson, 2020). These sites have grown so important that they are now fundamental to how we all think and feel; they have created a virtual marketplace where people from all over the world can meet, share ideas, and become entangled in the complex web of the internet (Almeida, 2020)**.**

1.1.4. Public Opinion on the Impact of Social Media

Social media's impact on public opinion goes well beyond its function as an information distributor; it changes and molds people's opinions, values, and actions online and, by implication, in society at large (Nozari, 2021). Users are able to do more than just consume content on social media platforms thanks to their interactive character, creating an environment that is conducive to lively debate, idea sharing, and active participation (Sharp, 2021). Users have a crucial role in shaping narratives within this digital ecosystem; they are not just observers of information being shared (ViglianoRelva, 2021). Online communities brought together in real time by social media allow people of many walks of life, beliefs, and cultural origins to converse with one another. With this interactive feature, people can

amplify the complex character of public conversation by sharing their own stories, voicing their opinions, and adding to the overall story. Users shape the parameters of public discourse and influence the trajectory of discussions through their likes, retweets, shares, and comments, which make them co-creators of material. Users are able to question established hierarchies and give a platform to viewpoints that may have been ignored by traditional media outlets because of the democratization of information sharing on social media. A rich tapestry of narratives reflecting the diversity of global society can be fostered through inclusion, which allows for a more comprehensive depiction of perspectives, experiences, and challenges. Social media's interactive features may also encourage users to take ownership of their actions. People create online groups and communities based on common interests when they interact with material that speaks to their core beliefs and priorities. Feeling like you belong somewhere helps people form group identities and learn to work together to address important social problems like climate change. When people are able to transform their collective thoughts into tangible actions, the mobilizing potential of social media is truly on display. Rapidly gaining traction, online movements, viral campaigns, and hashtags can generate real-world effect, surpassing digital borders. People may get together around shared issues, get the word out, and take action thanks to social media, which makes it easy to organize grassroots projects. In conclusion, social media's impact on public opinion is defined by its revolutionary capacity to enable users to actively participate in shaping the story of our shared digital culture. Through its ability to facilitate interaction, debate, and the sharing of different viewpoints, social media can play a pivotal role in changing attitudes, encouraging a feeling of collective duty, and coordinating group efforts to tackle urgent social issues**.**

1.2. Knowledge, Attitude, and Practice (KAP) Model

The Knowledge, Attitude, and Practice (KAP) model is a well-known theoretical framework that has widespread application in the fields of public health and the social sciences. In spite of the fact that the KAP model was first developed for the purpose of conducting research on health communication, it has been adapted for use in other areas, such as bringing attention to the issue of climate change. This particular illustration focuses on the subject of climate change, and the model provides a logical framework for understanding the dynamic relationship that exists between people's knowledge, attitudes, and actions in relation to this subject.

1. Knowledge

The KAP paradigm relies on knowledge as its primary component. In this instance, people's knowledge of climate change is a reflection of the information they possess on that subject. Being knowledgeable about climate change means being well-versed in the science behind it, its impacts, potential causes, and ways to lessen their impact. It is critical for people to have more knowledge so they can understand the complexity and severity of climate-related issues.

2. Attitude

Individuals' evaluations or sentiments toward a certain subject are reflected in their attitudes, which are based on their knowledge. An individual's environmental consciousness, sense of agency, and emotional reaction to the prospect of climate change are all factors that could influence their attitude toward the issue. A positive outlook is essential because it

encourages people to feel that their climate-related information matters to them and gives them the drive to learn more and take action.

3. Practice

Individuals put their knowledge and attitudes into practice when they engage in visible behaviors and actions. Some examples of behaviors related to climate change include making more environmentally conscious decisions in daily life, getting involved in local environmental programs and lobbying for changes in government policy. Individuals who are better informed and have a positive outlook are more likely to act responsibly toward the environment, according to the KAP model, which in turn helps in the fight against and adaptation to climate change**.**

1.3. Climate Change Awareness Application

When applied to the topic of climate change, the KAP model provides a useful framework for evaluating the efficacy of public education initiatives, advocacy groups, and other forms of public outreach. Experts in the field can pinpoint strengths and places for improvement by taking stock of people's knowledge, attitudes, and observed behaviors. Because of this, climate change communication campaigns can be crafted to be more specific and effective. To sum up, the KAP model provides a comprehensive framework for comprehending how people react to and interact with climate change information. The model offers insights that might help improve methods to raise climate change awareness and encourage sustainable behaviors by acknowledging the interdependence of knowledge, attitudes, and practices.

1.4. Problem Statement

In the less developed vicinities, notably the Sukkur district nestled in Sindh province of Pakistan, the menace of climate change looms more ominously over human habitation. Despite a surge in scientific cognizance, the denizens of Sukkur district find themselves in the throes of informational dearth and lackluster engagement with global endeavors aimed at mitigating climate change's brunt. Amidst the burgeoning clout of social media as a conduit for environmental enlightenment, scant insights persist regarding its efficacy in enhancing climate change comprehension within the Sukkur district's confines. This inquiry endeavors to gauge the role of social media in elevating climate change awareness across the Sukkur landscape, alongside evaluating the potency of varied social media channels deployed for such endeavors. The outcomes of this examination promise to illuminate superior strategies for social media-driven climate change communication, thereby unraveling the prospects of leveraging social media in addressing climate change quandaries in the Sukkur territory.

1.5. Significance of Study

By administering the Knowledge, Attitude, and Practice (KAP) model to social media users in Sukkur, this study investigates how social media influences climate change awareness. This study intends to address a significant information vacuum by investigating the dynamics of local climate change awareness in Sukkur, taking into account the specific cultural and environmental features of the city. Recognizing the significance of localized factors in determining the success of climate change communication, the study refines current theories by focusing on Sukkur. A new angle on the ways social media affects

learning, attitude formation, and eco-friendly behavior may be seen through the KAP model's testing in Sukkur. Both the theoretical and practical sides are improved by the study, which provides insights for more targeted communication strategies. Implications for climate change awareness initiatives extend beyond the realm of academia and into the real world. Sukkur users' social media behaviors can be used to create interest-based, personalized programming. Improve the reach and impact of climate change messaging by identifying preferred content formats, communication channels, and influencers. This facilitated good behavioral adjustments. The larger relevance of the study is in the information it may provide to other domains that are dealing with comparable problems. For more complex and culturally conscious environmental awareness initiatives in a society where social media influences public opinion, Sukkur's story might be an inspiration. Sukkur people' climate change understanding, social media use, and actions are better understood thanks to this study. This knowledge is useful for academic debate and climate change advocacy efforts both in Sukkur and beyond. Model refinement, practical implications for communication strategies, and additions to academic knowledge.

1.6. Objective of the Study

- To assess the effectiveness of the Knowledge, Attitude, and Practice (KAP) paradigm in measuring climate change awareness among social media users in Sukkur.

- To evaluate the impact of social media channels in distributing information regarding climate change in the Sukkur region.

- To examine the influence of social media on the awareness levels of Sukkur's social media users with regards to climate change matters.

- To investigate the role of social media in Sukkur in promoting sustainable environmental behaviors among its users, by understanding how engagement with climate change content influences attitudes and leads to actionable practices.

1.7. Research Questions

To achieve the research objectives mentioned above, the following research questions will guide the study:

RQ-1: How does exposure to climate change content on social media platforms affect the knowledge of Sukkur's social media users regarding climate change issues?

RQ-2: In what ways do social media platforms shape the attitudes of Sukkur's users towards climate change and environmental sustainability?

RQ-3: How do interactions with climate change content on social media influence the environmental behaviors and practices of users in Sukkur?

RQ-4: Are there demographic differences in the knowledge, attitudes, and practices (KAP) related to climate change among social media users in Sukkur, and how do these differences affect the impact of social media on climate change awareness?

1.8. Delimitation of the Study

- The study's limitations include its specific emphasis on social media users in Sukkur and the fact that its conclusions cannot be applied to other communities.

- Other, more specialized social media sites may go unnoticed in favor of the big four: Facebook, Twitter, Instagram, and YouTube.
- This study restricts our ability to draw firm conclusions about information channels because it does not investigate offline factors that contribute to climate change awareness.
- Since the KAP model is only evaluated in the setting of Sukkur, its findings could not be immediately applicable to other areas with distinct social, cultural, and environmental dynamics.

During the study period, social media users' perspectives could have been impacted by external events or campaigns that had nothing to do with climate change. However, this is not addressed in the study

CHAPTER NO 2

2.0 Literature Review

2.1 Climate Change Communication

Understanding, caring about, and taking collective action in response to climate change is the goal of climate change communication, a dynamic and multi-faceted discipline that includes information transmission, awareness-building, and engagement tactics. The need for efficient communication has grown in tandem with the scientific community's growing agreement on the fact of human-caused climate change and its far-reaching consequences. Discussing the global issue of climate change encompasses not only the intricate scientific components, but also its socio-economic, political, and ethical implications. In order to keep up with the ever-changing ways people consume information in today's linked world, climate change communication strategies use a wide variety of channels, from more conventional media to innovative digital platforms. Improving understanding of climate change and its effects, encouraging sustainable habits, and bringing communities together to take action are all important goals (León, 2022). The necessity for inclusive and equitable discourse on climate change is further highlighted by the fact that it is intrinsically related to environmental justice concerns, particularly in light of the disproportionate effects of climate change on disadvantaged populations. Communicating about climate change effectively requires a sophisticated and context-specific approach because it is highly dependent on cultural contexts, belief systems, and personal experiences. The importance of excellent communication cannot be overstated as our society faces the pressing need to address climate change. It connects scientific understanding with social actions, fostering a shared resolve to create a future that is both sustainable and resilient.

Strategic communicators can greatly benefit from audience segmentation, such as Global Warming's Six Americas, which provides a theoretically and empirically sound framework and method for identifying and understanding target audiences (Krishnan & Anoop 2023). This, in turn, allows for more efficient and successful public engagement in climate research and its remedies, all the while galvanizing support for concrete climate change measures. We conduct an experiment with a representative sample of 448 individuals from the United States to determine the effect of climate change imagery's degree of concreteness and abstraction on climate change responses, drawing on construal-level theory.

The results disprove the hypothesis that specific visual messaging strategies can induce a rise in worry or a change in behavior. Conservatives, the ineffective, and those with weak pro-environmental principles are more likely to experience its opposite. Incorporating a construal-level viewpoint, our findings add to the research on effective climate change visual communication and provide practical implications for improving public engagement with climate change through visual means. While there has been some recent work in cartography describing the storytelling potential of maps, there has been little empirical evaluation of how storytelling might inform map design decisions (Umboh, 2023). Research contends that by focusing the map's attention, cartographers are able to make decisions about the map's fundamental design aspects through storytelling. Locators must first settle on the overarching narrative. Next, the narrative is invoked as a roadmap for all design choices, including how to incorporate symbolism into the map's layout and what data to gather and utilize. The case study of American climate change communication is the center of this research. Data derived from in-depth interviews with climate change mappers working for prominent news outlets and government agencies shows that the story-telling

process was crucial in helping these cartographers communicate the complex and multi-scale effects of climate change. Cartographers are able to more effectively convey the effects of complicated environmental issues like climate change through this narrative technique, which allows them to connect with readers. Using narrative as a lens through which to examine cartographic communication and the creation of maps is the article's last point. Some estimates put the percentage of unfavorable environmental news reports at as high as 98%. This figure reflects the common belief among communicators that raising people's knowledge, awareness, concern, or even dread of climate change is an essential step before movement and shift in conduct (León, 2021). This article explains why this common perception is incorrect by reviewing scientific theories of the brain and mind. By engaging in a cycle of self-justification and self-persuasion, our actions shape our beliefs, awareness, and concerns, rather than the other way around. This self-persuasion process can go hand in hand with a deeper involvement and the development of agency—knowing how to act—as one action leads to another. Observing and mimicking the behaviors of those around you is a great way to gain agency. As a result, we suggest a method of climate storytelling and communication that gives many examples of individuals making a difference in the fight against climate change, empowering them to take action on their own. If implemented on a large scale, this will change how people think about climate change from an "issue-based" to an "action-based" perspective. The existing popular definitions of "climate action" (i.e., "consumer action" and "activism") will also be broadened to encompass all pertinent community, professional, and citizen-level behaviors. In conclusion, drawing on lessons learned from COVID-19 health communication and technology, we suggest a methodical strategy to increasing the amount of scientific, technological, and societal reference material

available to storyteller communities for use in creating action-based narratives (Upadhyaya, 2022).

2.2 Conventional Methods for Addressing Climate Change

In the past, people have used a variety of methods to lessen or adjust to the harmful impacts of climate change. In dealing with climate change, these are the standard practices. These methods often build on top of existing regulations, policies, and technologies that were created to promote sustainable development, increase resilience, and decrease emissions of greenhouse gases. An examination of some of the more conventional strategies used to combat climate change is presented below:

Embracing the Future of Renewable Energy

One of the most important things the world can do to combat climate change is to switch from using fossil fuels to renewable energy. Societies are moving away from traditional, carbon-intensive energy sources and toward cleaner alternatives, and this revolutionary technique highlights this transition. Renewable energy sources, including solar, wind, hydroelectric, and geothermal power, are leading the charge in this shift because they provide a long-term, eco-friendly substitute for traditional fossil fuels. In light of fossil fuels' major contribution to global warming and greenhouse gas emissions, the shift to renewable energy sources mainly aims to reduce the world's dependence on these fuels. A more sustainable and resilient energy infrastructure, less carbon emissions, and lessened climate change impacts are the goals of the worldwide community's push for and implementation of a massive transition to renewable energy. The limitless power of the sun can be harnessed through solar thermal technology and photovoltaic cells to produce electricity. The use of wind turbines to produce electricity is a form of wind energy that is

produced from the kinetic energy of moving air masses. The use of dams or river turbines to harness the energy of flowing water is known as hydroelectric power. Geothermal energy is a way to generate electricity or direct heat from the Earth's interior, which has several practical uses. Diversifying the energy portfolio, increasing energy security, and avoiding environmental damage are all goals of these renewable sources, in addition to providing a cleaner energy alternative (Pupneja, 2023).

Energy Efficiency Measures

One of the many facets of the climate change mitigation strategy is the optimization of energy use across different sectors, which is why improving energy efficiency is so important. The urgent need to reduce energy consumption in buildings, transportation networks, and industrial processes necessitates the adoption of numerous cutting-edge technological solutions and best practices. Reduced overall energy demand and, by extension, greenhouse gas emissions from energy production and consumption, is the ultimate aim of more prudent energy resource utilization. Energy efficiency measures in the built environment take many forms, all with the common goal of reducing power usage. Included in this are the installation of efficient lighting and appliances, the use of smart building design concepts, and the installation of strong ventilation and insulation systems. Energy-efficient appliances are essential in lowering the electrical demand of homes and businesses due to their lower power consumption and improved performance. Modern technology like occupancy sensors, energy management systems, and building automation systems are utilized in smart building design to maximize efficiency in energy usage. To make sure that energy is used efficiently and only when needed, these systems allow for the real-time monitoring and management of different building components, such as HVAC systems, lights, and more (Cann, 2021). Modern building materials and methods also help

reduce heat loss or gain, making for more energy-efficient buildings. Energy efficiency techniques play a crucial role in the transportation industry in reducing the negative effects of vehicular activity on the environment. Public transportation infrastructure upgrades, fuel-efficient vehicle research and development, and the widespread availability of hybrid and electric vehicles all play important roles. Lighter materials, more aerodynamic designs, and more energy-efficient propulsion systems are just a few examples of how transportation technology has advanced, which helps bring down emissions and fuel usage. Improving energy efficiency on an industrial scale entails implementing various methods and technologies that optimize energy use in production and manufacturing. Among these measures are the incorporation of energy management systems, the use of industrial machinery that is more energy efficient, and the integration of systems for combined heat and power (CHP) or cogeneration. In order to find inefficiencies and develop individualized plans to fix them, energy audits and assessments are commonplace. In addition to lowering carbon emissions, these energy efficiency initiatives have a multiplicative effect on the economy and improve energy security. Reducing overall energy consumption creates resilience in the face of fluctuating energy prices, decreases reliance on scarce energy resources, and lessens the need for additional energy infrastructure. Essentially, implementing energy efficiency measures is a realistic and proactive way to combat climate change. Societies can tackle the pressing issues of climate change and move towards a more sustainable energy future by embracing sustainable habits, integrating innovative technologies, and cultivating an energy consciousness culture (Bali, 2023).

Treaties and International Agreements

When it comes to addressing the complicated and interrelated problems caused by climate change, international treaties and agreements are crucial in forming a coordinated

and collective response (Christodoulou, 2023). The Paris Agreement, a watershed agreement under the UNFCCC that emphasizes the resolve of states to tackle climate change in its entirety, is in the front of this worldwide concerted effort. In order to limit global temperature increases, curb greenhouse gas emissions, and create resilience to the impacts of climate change, these international accords function as frameworks that set targets, provide rules, and enable collaboration among governments. International climate diplomacy reached a watershed moment with the 2015 adoption of the Paris Agreement. Worldwide, nations are coming together under the Paris Agreement to reduce emissions of greenhouse gases and work towards the common objective of keeping the increase in global temperatures well below 2 degrees Celsius above pre-industrial levels, with an even more lofty aim of 1.5 degrees Celsius. This collective effort is called the Nationally Determined Contributions (NDCs). The focus on attempts to reduce emissions is a key component of international climate agreements. Countries pledge to reduce their carbon footprint, switch to renewable energy, and adopt sustainable practices in a variety of industries through a combination of legislation and actions. By pledging to cut emissions, countries are recognizing that combating climate change is a global problem that calls for concerted effort. Additionally, developed and poor nations are able to share information and technology more easily because to international climate accords. These agreements aim to help transfer climate-resilient and low-carbon technology to close the resource and capacity gap. In order for poor nations to skip conventional, carbon-intensive growth routes and start with sustainable practices, this transfer of technology is crucial. One of the most important parts of global climate accords is financial aid for underdeveloped countries (De-Lara, 2022). These accords set up systems for financial aid in recognition that vulnerable nations may endure more severe climate change effects and have less means to adapt and lessen their

impact. Sustainable development approaches, capacity-building programs, and climate change adaptation projects all fall under this category. There is a greater sense of unity in the fight against climate change because of the cooperative character of international agreements. Nations are able to assess their progress, exchange experiences, and collaboratively improve policies to address the changing climate change concerns through regular meetings, conferences of the parties (COP), and discussions. By allowing for periodic updates, the iterative nature of these agreements guarantees that pledges are in line with the most recent scientific discoveries and technology breakthroughs. Lastly, the Paris Agreement and other international laws and agreements are essential to the worldwide fight against climate change (Deo & Prasad, 2020). By extending across national borders, these frameworks encourage teamwork, mutual accountability, and the dedication to creating a future that is both robust and sustainable. These accords lay the groundwork for international collaboration to address the complex issues of climate change by resolving carbon reduction, technology transfer, and financial assistance**.**

2.3 The Transition to Digital Platforms for Climate Change

A revolutionary and exciting new method to get people involved, educate them, and motivate them to take action in this digital era is to move the conversation about climate change online. This manner of doing things is a new way to get people involved. The use of digital platforms to communicate about climate change is being done in order to address the complexity of this national and international problem. The internet's extensive reach, accessibility, and interactive capabilities are all utilized in this way to achieve the desired results. In this article, we take a comprehensive look at the numerous facets of this change:

Information transmission over the Internet

Online information dissemination, propelled by the ubiquity and accessibility of digital platforms, stands as a transformative force in communicating timely and accurate information about climate change. Websites, social media platforms, blogs, and online news outlets have become powerful vehicles for the rapid and widespread sharing of scientific findings, climate-related news, and educational resources. This digital dissemination ensures that the public, irrespective of geographical locations, has convenient and immediate access to up-to-date information on climate change. The real-time nature of online platforms facilitates the swift transmission of breaking news, emerging research, and critical updates, fostering a more informed and engaged global community. By leveraging the reach and interactive features of these platforms, environmental organizations, scientists, and educators can effectively convey the complexities of climate change, promote awareness, and empower individuals to make informed decisions in the collective effort to address and mitigate the impacts of climate change (Fatharani, 2023).

Campaigns Utilizing Social Media

The use of social media campaigns has become increasingly important as a means of influencing public views and guiding talks about climate change. These platforms function as dynamic forums where individuals, influencers, environmental organizations, and activists come together to disseminate messages relating to climate change with an unprecedented level of reach and immediacy. Through the utilization of strategic aspects such as hashtags, appealing visual content, and interactive features, these campaigns are able to overcome the conventional hurdles that are associated with communication. They cultivate an environment that is conducive to individuals actively participating in debates, exchanging information, and amplifying the urgency of taking action regarding climate change. Influencers, who have a significant impact on a wide range of people, work together

with environmental organizations to use social media platforms such as Twitter, Instagram, and Facebook, where they have big followings. Through a concentrated effort, these digital champions are able to mobilize audiences, generate conversation, and spread information that extends beyond the channels that are traditionally used (León, 2022). The effectiveness of social media campaigns rests in their capacity to span geographical barriers and demographic differences, so developing a collective sense of responsibility and empowering an audience on a worldwide scale to advocate for environmentally conscious activities and sustainable practices**.**

Digital Storytelling

The use of digital storytelling to portray the tremendous effects of environmental alterations on a human and emotional level is a style of storytelling that makes use of the narrative possibilities of digital platforms. The effects of climate change are humanized through the use of captivating narratives that are crafted by individuals and groups using various mediums such as videos, podcasts, and multimedia content. These narratives translate abstract statistics into experiences that are relatable to the audience. A visceral connection is created through the use of digital storytelling, which is accomplished by intertwining facts with human narratives. This connection encourages individuals to empathize with the implications of climate change and inspires them to take meaningful action in protecting the environment (Martirano, 2023).

2.4 The Role of Social Media in Raising Environmental Awareness

Having social media make a big splash in raising environmental consciousness is crucial. There is a revolutionary potential for these forums to influence public awareness of critical environmental issues. At a rate never before witnessed, information regarding

sustainability, biodiversity loss, and climate change is being disseminated on platforms like Facebook, Twitter, Instagram, and YouTube. The contagious nature of social media material can help cultivate a feeling of community and shared accountability. This makes it possible for environmental messages to instantly reach people everywhere. Users participate in real-time conversations, share personal tales, and engage in personal experiences by joining online movements that amplify narratives about the environment. In addition to making information more widely available, social media also helps bring people together in an online community that shares a common goal: protecting the environment (Mayfield, 2021). Activists, groups, and powerful individuals working to improve the environment use these platforms to rally support for causes including sustainable practices, new policies, and changes in personal conduct. Thanks to visually stunning material, engaging narratives, and interactive marketing, social media may break down geographical barriers. Because of this, we can successfully rally an international audience to raise awareness about environmental issues and the need for collective action to solve them**.**

2.5 Promoting Environmental Issues through Social Media

A potent platform that amplifies voices, speeds information transmission, and mobilizes collective action, social media has revolutionized environmental advocacy. Organizations, activists, and environmentalists may reach audiences all over the world using social media and video sharing websites like YouTube, Instagram, Twitter, and Facebook. A greater understanding of environmental issues can be quickly disseminated through the use of interactive elements, visually appealing content, and real-time updates. By connecting people who share an interest in environmental issues, sharing ideas and organizing, social media facilitates the development of stronger communities. Environmental issues can

become viral campaigns through the use of hashtags and current topics, bringing people together online to support conservation, climate action, and sustainability measures. By utilizing their internet platforms, influential people and thought leaders may spread informative content, increase awareness, and motivate their followers to live a greener lifestyle. Social media's capacity to put faces to otherwise intangible problems is a major asset when it comes to environmental advocacy (Moe, 2023).

Environmental issues can be better understood and addressed when individuals and groups share their personal narratives, triumph tales, and first-hand reports. By focusing on people, we can increase empathy and create a feeling of urgency, which in turn inspires people to make a difference in their local areas. Social media environmental movements frequently unite people from all around the world, regardless of their physical location. People all over the globe can join together in advocacy activities for environmental justice and policy changes through online petitions, coordinated actions, and virtual rallies. The inclusion of varied perspectives and marginalized voices in the environmental conversation is ensured by the democratization of information on these platforms. In addition, the visual aspect of social media makes it easy to convey the effects on the surroundings. Images, movies, and infographics show how pollution, habitat loss, and climate change affect the environment, and they force viewers to face the truth about how bad things are. In addition to providing information, this visual storytelling style evokes feelings, which helps the audience relate to the topics more deeply. The way people interact with businesses and governments has also changed because of social media. By promoting transparency and holding businesses to account for their environmental policies, environmental advocacy campaigns on these platforms can encourage a change toward more responsible and sustainable behaviors. While it's true that social media has made environmental advocacy

more effective, it has also brought new problems, like false information and "greenwashing"—the practice of making claims about being environmentally friendly without actually doing anything to improve the environment (Mussa, 2023).

It is crucial for consumers to possess critical thinking skills and media literacy in order to navigate these complexities. Fundamentally, a new way of thinking about and talking about

environmental concerns has emerged with the advent of social media for environmental advocacy. A new generation of educated and involved environmental stewardship can be fostered through the unparalleled possibilities presented by the instantaneity, interconnection, and worldwide reach of these platforms in response to environmental crises**.**

2.6 Successful Campaign Examples

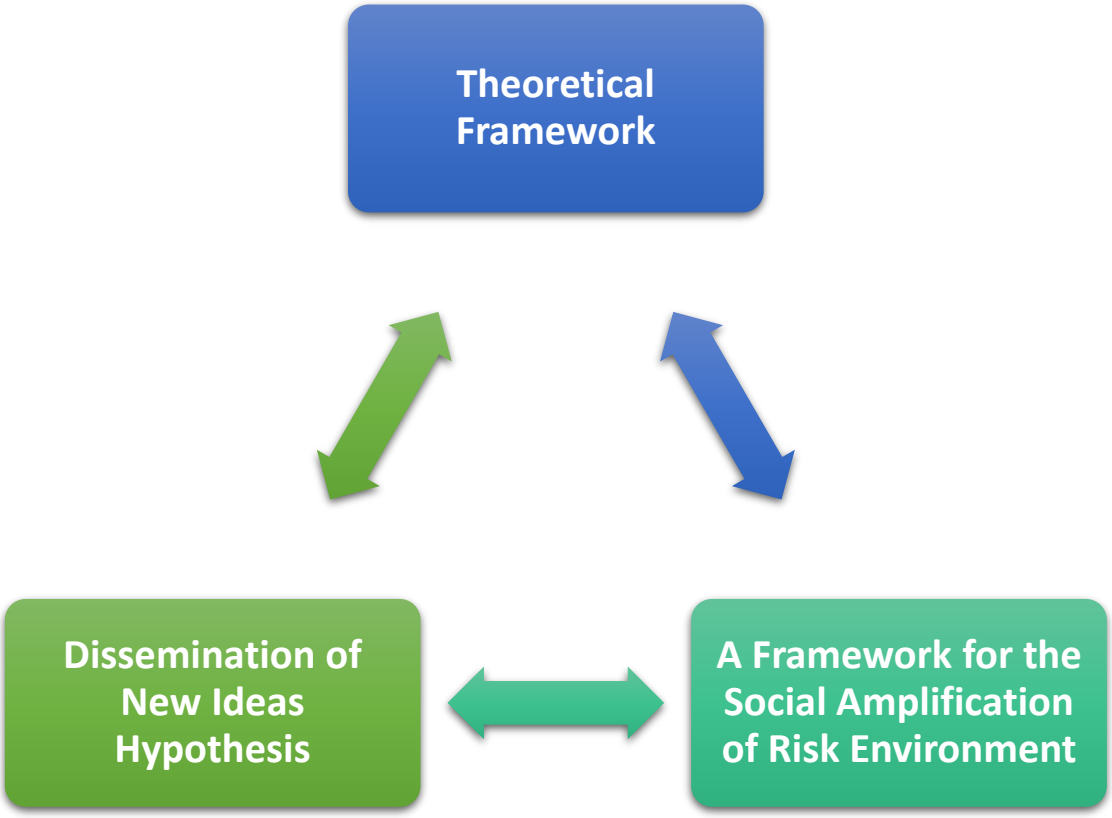
The revolutionary power of social media has been demonstrated by a number of successful initiatives that have used the platform to promote environmental causes. One such example is the #Fridays for Future movement, which was started by Swedish environmental activist Greta Thunberg. Millions of students around the world were inspired by Thunberg's inspiring climate action tweets and postings, leading to climate strikes and a demand for immediate government action. The success of this movement exemplifies the ability of social media to mobilize people, particularly when it comes to organizing a worldwide project headed by young people that is decentralized (Pupneja, 2323).

While the ALS Ice Bucket Challenge isn't exactly green, it is a perfect example of how social media initiatives can go viral. Raising awareness and donations for ALS research, participants transformed a simple act—dumping buckets of cold water over their heads—

into a worldwide phenomenon. This campaign exemplifies how social media can take a playful challenge and turn it into a powerful instrument for activism. Once again, the power of social media to inspire constructive environmental action is on full display in the #Trash tag Challenge. Popular on photo-sharing sites like Instagram, this grassroots campaign calls on users to clean up trashy places, record their progress, and issue challenges to their followers. The challenge's ability to become viral shows how social media can unite people around a common cause, like environmental protection, and change people's habits and attitudes for the better. After the terrible fires in the Amazon jungle, people turned to social media to get the word out and rally support (Pupneja, 2020).

As a result of the fires, the hashtag #Pray for Amazonia went viral, drawing attention to the impact on the environment and indigenous peoples' rights. Organizations and activists used a variety of channels to disseminate infographics, solicit financial support, and pressure governments into action. By quickly disseminating information and rallying collective actions for environmental reasons, this example demonstrates the vital role that social media plays in crisis response. All of these initiatives show how social media has changed the game for environmental causes. The platform's ability to mobilize different audiences and amplify voices in pursuit of environmental knowledge and positive action has been demonstrated by its role in launching global movements, influencing public perception, and achieving meaningful change (Tuitjer&Dirksmeier, 2021).

2.7 Theoretical Framework



1.8.1. Dissemination of New Ideas Hypothesis

A significant lens for understanding the adoption and dissemination of new ideas, technologies, or behaviors within a social system is provided by Everett Rogers' Diffusion of Innovation Theory. This theory was developed by Rogers. One of the most important aspects of this theory is the concept of innovation diffusion, which refers to a process that is defined by the gradual acceptance and adoption of an innovation by members of a community or society. Innovative adopters, early adopters, early majority adopters, late majority adopters, and laggards are the five key adopter categories that are identified by the theory. Each of these categories represents a different stage in the diffusion process. It is common for innovators and early adopters to play a significant part in shaping the adoption curve. Furthermore, the interactions that these individuals have with other members of the

social system are necessary for wider acceptance. In the context of social media and communication about climate change, the Diffusion of Innovation Theory is helpful in elucidating how environmental messages spread through online networks, the role that influential figures play in driving awareness, and the factors that influence the rate of adoption and the extent to which it occurs within the digital realm. An understanding of the difficulties involved in applying the theory to complicated and nuanced issues such as communication around climate change is necessary, despite the fact that the theory offers useful insights. These difficulties include overcoming skepticism and successfully navigating varied audience responses.

1.18.1.1 Limitations of Diffusion of Innovation Theory in This Research:

Complexity of Climate Change Messaging: The theory assumes a relatively linear adoption process, but climate change messaging is complex, involving nuanced and diverse perspectives that don't always fit into clear stages of adoption.

Heterogeneous Audience: The theory categorizes adopters into five groups, but the audience in Sukkur may not align with these categories due to varying levels of access to social media, education, and awareness.

Cultural and Social Context: The theory doesn't fully account for the specific cultural and social dynamics in Sukkur, which may affect how climate change ideas are received and spread.

1.8.2. Influencer Impact: While the theory highlights the role of early adopters, the effectiveness of influencers in raising climate change awareness in this region

may be limited by local norms, trust levels, and language barriers. A framework for the Social Amplification of Risk Environment

The Social Amplification of Risk Framework offers a comprehensive perspective that can be utilized to gain an understanding of the intricate relationship that exists between the perception of risk, the communication processes, and the responses of society. This framework, which has its roots in the field of risk communication, places an emphasis on the sociocultural amplification processes that have an effect on the public's comprehension and reaction to risks, including those that are associated with climate change. As risk events travel through various social stations, such as the media, interpersonal networks, and cultural contexts, the theory proposes that they go through a dynamic process of amplification or attenuation. This is the central tenet of the theory. The framework emphasizes the significance of media representation in shaping public risk perceptions and the subsequent amplification or attenuation of those perceptions through social interactions. This is done in order to highlight the importance of media representation. The Social Amplification of Risk Framework becomes especially pertinent when applied to the context of climate change communication on social media. This framework makes it possible to investigate the manner in which information is disseminated, interpreted, and magnified within digital communities. It also sheds light on the factors that contribute to the increased awareness or attenuation of climate-related risks in the online sphere. However, it is essential to acknowledge the limitations of the framework. These limitations include the inherent difficulties in identifying and quantifying amplification factors, as well as the requirement for nuanced considerations of a variety of audiences and cultural contexts. Therefore, it is essential to acknowledge these limitations in order to ensure a more comprehensive understanding of the framework's applicability.

1.8.2.1 Limitations of Social Amplification of Risk Framework in This Research:

Measuring Amplification: Quantifying how social media amplifies or attenuates climate change risks is challenging, particularly in a region like Sukkur, where digital literacy and social media usage patterns vary widely.

Context-Specific Factors: The framework emphasizes media representation but may not fully address how local cultural contexts and economic factors influence risk perception and communication.

Audience Diversity: The framework may not sufficiently capture the diverse responses of different demographic groups within Sukkur, which could impact the effectiveness of climate change messaging on social media.

Generalizability: While useful for understanding broader patterns, the framework may have limitations in capturing the specific dynamics of social media communication and risk perception in a localized, developing-world context like Sukkur.

CHAPTER NO 3

3.0 Research Methodology

3.1 Research Design

To examine the impact of social media on raising climate change awareness, this study used a cross-sectional survey as its research design. This type of survey is ideal for capturing a snapshot of people's knowledge, attitudes, and behaviors in relation to the topic. You can learn a lot about the current situation without having to commit to anything for a long period of time by doing a cross-sectional poll, which is great for getting a feel for how people are thinking right now. With this layout, we can evaluate how people feel about climate change, what they do to combat it, and how much of an impact social media has on their awareness in just one round of data gathering. An online survey, in the form of a questionnaire, was sent out to participants particularly student and adults as part of this study's methodology. By doing the survey online, we can increase accessibility and perhaps reach a more varied and large audience. In order to facilitate organized and time-saving data collecting, the questionnaire only included closed-ended questions. Important topics covered by these questions include participants' knowledge of climate change, where they get their climate-related news, and what they do to help slow or stop the effects of climate change. The survey questions are designed to be closed-ended so that data analysis is made easier. This way, respondents can provide measurable answers that can be simply categorized and analyzed statistically. The goal of this method was to collect quantitative information so that we can get a more complete picture of how they felt. The poll intends to glean thorough insights into the complex interaction between social media and climate change awareness by concentrating on important variables including awareness, information sources, attitudes,

etc. When it comes to studying people's climate change awareness and actions in the social media sphere, the cross-sectional survey design using an online questionnaire is often a good methodological choice.

3.2 Potential Biases Introduced by Using an Online Survey Method:

1. **Selection Bias:** Participants are likely more active on social media, excluding those with limited internet access, which may not fully represent Sukkur's broader population (Wright, 2005).

2. Self-Selection Bias: Those interested in climate change may be overrepresented, limiting the generalizability of findings (Bethlehem, 2010).

3. Response Bias: Respondents may provide socially desirable answers, skewing data on attitudes and behaviors (Furnham, 1986).

4. Limited Demographic Reach: The survey may miss older adults or those from lower socioeconomic backgrounds, underrepresenting certain groups (Couper, 2000).

5. Non-Response Bias: Individuals who do not participate may differ significantly in their views, affecting the study's overall findings (Groves & Peytcheva, 2008).

3.3 Sampling Technique

The convenience sampling strategy was selected for this study because it is practicable and allows participants to be recruited depending on their availability and willingness to

participate in the research. In total 250 People who use social media and show an interest in climate change are the ones we're studying since that's how we know social media can help spread the word about climate change. The sample was selected from well-known social media sites like Instagram, Facebook, and Twitter, where a wide variety of people talk about climate change. In order to recruit volunteers, the study's purpose was communicated through targeted invitations and announcements on these media. Also, participants were made aware that their involvement is completely optional throughout the recruitment process, and they were able to stop participating in the study at any time without any negative consequences. Ethical standards were maintained throughout the study since all participants will be given an informed consent document that explains the research's goals, methods, and their rights before they are involved. Improving the study's relevance and generalizability, our sampling technique seeks to capture a representative sample of persons with a genuine interest in climate change and an active social media presence.

3.4 Variable

To effectively analyze the impact of social media on climate change awareness in Sukkur, we need to conceptualize and operationalize the variables involved in the study. This helped in designing the research methodology and interpreting the data collected accurately.

Independent / Individual Variable: Usage of Social Media for Climate Change Information

- **Conceptual Definition**: This involves the extent to which individuals in Sukkur use social media platforms (e.g., Facebook, Twitter, Instagram) to seek out, share, and discuss information related to climate change. It captures the

frequency, diversity, and intensity of social media interactions focused on climate change topics.

- **Operational Definition**: To measure this variable, you could use survey questions that ask respondents about their frequency of accessing social media for climate change information, the types of platforms they use, and the nature of their interactions (e.g., reading posts, sharing information, engaging in discussions). This could be quantified using a Likert scale (e.g., from "strongly agree" to "strongly disagree") or through specific frequency measures (e.g., hours per week).

- **Dependent / Compound Variables: Knowledge, Attitudes, and Practices (KAP) Regarding Climate Change**

1. **Knowledge**

- **Conceptual Definition**: The level of understanding individuals have about climate change, including its causes, effects, and mitigation strategies.

- **Dimensions of Climate Change Knowledge**

This dimension encompasses the extent of understanding and awareness individuals possess regarding climate change phenomena. It includes a comprehensive grasp of the various factors contributing to climate change, such as greenhouse gas emissions, deforestation, and industrial activities. Moreover, it entails knowledge of the potential consequences of climate change on ecosystems, communities, and economies. Climate change knowledge also entails familiarity with fundamental principles of climate science, including concepts like the greenhouse effect, global warming, and climate variability.

- **Operational Definition**: This can be accessed through quiz-like questions or statements requiring true/false or multiple-choice responses that gauge the respondent's awareness and understanding of climate change facts and science.

2. **Attitudes**

- **Conceptual Definition**: Individuals' feelings and evaluations regarding climate change, including concern, urgency, skepticism, and perceived responsibility.

- **Dimensions of Climate Change Attitudes:**

This dimension revolves around individuals' attitudes, beliefs, and perceptions concerning climate change. It encompasses their stance towards strategies aimed at mitigating and adapting to climate change, such as endorsing the adoption of renewable energy sources, implementing carbon pricing mechanisms, supporting reforestation initiatives, and endorsing international agreements like the Paris Agreement. Additionally, climate change attitudes encompass beliefs regarding the urgency of addressing climate change issues, perceptions of personal and collective responsibility for mitigating and adapting to climate change impacts, and the readiness to engage in pro-climate behaviors.

- **Operational Definition**: Measured using a series of statements about climate change to which respondents can express their level of agreement or disagreement on a Likert scale (e.g., "strongly agree" to "strongly disagree").

3. **Practices (Behaviors)**

- **Conceptual Definition**: The actions taken by individuals in response to their knowledge and attitudes towards climate change. This includes personal and public efforts to mitigate or adapt to climate change.

- **Dimensions of Climate Change Behavior:**

This dimension encapsulates the actions and behaviors undertaken by individuals in response to climate change concerns. It encompasses a spectrum of activities ranging from individual-level behaviors, such as reducing energy consumption, practicing water conservation, utilizing public transportation, recycling, and composting, to collective actions like participating in climate advocacy, advocating for policy reforms, patronizing sustainable businesses, and actively engaging in community resilience-building initiatives. Climate change behavior reflects individuals' endeavors to curb greenhouse gas emissions, adapt to climate change impacts, andfoster environmental sustainability.

- **Operational Definition**: This variable can be operationalized by asking respondents to report their participation in specific climate-related behaviors, such as recycling, using public transportation, engaging in advocacy, or changing consumption habits. Responses can be quantified by frequency or by the presence/absence of these behaviors.

Control Variables: Demographic Factors

- **Conceptual Definitions and Operational Definitions**:

1.**Gender**: Conceptually, this refers to the social categories of male, female, and other identities. Operationally, it can be measured by a single question with predefined categories.

2.**Age**: Conceptually, this is the chronological age of respondents. Operationally, it can be measured either continuously (asking for exact age) or categorically (age ranges).

3.**Education Level**: Conceptually, this reflects the highest level of formal education completed by the respondent. Operationally, this can be categorized into levels (e.g., high school, undergraduate, postgraduate).

4.**Social Media Usage (General)**: Conceptually, this captures the overall frequency and type of social media use, not limited to climate change content. Operationally, this can be measured by asking about the average time spent on social media and the platforms used most frequently.

By clearly defining and measuring these variables, the study can systematically investigate the role of social media in shaping the climate change knowledge, attitudes, and practices of individuals in Sukkur, while accounting for the potential influence of demographic factors.

3.5 Population

Social media users who have expressed an interest in climate change issues will make up the bulk of the study's population. Volunteers' availability and interest in taking part in the study will determine their final selection. People living in urban and semi-urban regions who are 18 years old and older will be the primary focus of the study. This will guarantee a diverse and mature perspective. The goal of this demographic focus is to include a wide range of perspectives and experiences that are common in today's society. The study will recruit users from a variety of social media sites, such as Instagram, Facebook, and Twitter, among others, to ensure that the sample is representative of the wide range of social media

members. This study aims to provide a detailed picture of how people in various online communities interact with and react to campaigns to raise awareness about climate change by using a variety of social media platforms. This method allows for a thorough investigation of how social media spreads information on climate change across a diverse and representative sample, which in turn increases the study's validity and generalizability.

3.6 Data Collection

To gather information for this study, we utilized Google Forms. This is popular online survey platform, to conduct a thorough online survey. The survey was intended to collect quantitative data in a strategic manner; it aims to inquire about people's knowledge of climate change, where they get their information about the topic, and their views and actions concerning environmental sustainability. The survey consisted of four parts; the first part asked participants to submit some basic demographic information so that the other parts can be understood. What follows is an examination of climate change-related information, perspectives, and behaviors. In order to allow for fast data analysis, we will be using closed-ended questions that cover a range of awareness levels and attitudes. Respondents had the ability to choose from predefined options. The survey will be thoroughly tested before it is officially distributed to make sure the questions are clear and easy to comprehend. To ensure that participants have a smooth experience, this pre-testing will also check that the survey instrument is functioning and easy to use. After it has been fine-tuned, the survey will be shared across various social media platforms to reach a large audience. This will increase the likelihood of different replies, enhance the data gathering process, and ensure that the results are representative and robust.

3.7 Data Analysis

The data collected from the survey was undergone a meticulous analysis, employing various statistical techniques to glean meaningful insights into the role of social media in creating awareness on climate change. Descriptive statistics, such as frequencies and percentages, was employed to provide a comprehensive overview of the survey responses. This quantitative analysis helped outline the prevalence and distribution of different perspectives, behaviors, and awareness levels among the survey participants. Statistical software, specifically SPSS (Statistical Package for the Social Sciences), was utilized to conduct a rigorous examination of the collected data, ensuring accuracy and efficiency in the analysis process. The results of the survey were visually represented through the creation of tables and charts. This graphical representation served to elucidate patterns, trends, and variations within the dataset, offering a clear and accessible presentation of the survey findings. Furthermore, these visual aids will facilitate the communication of complex statistical information to a broader audience. To enrich the interpretation of the survey results, the findings will be discussed within the theoretical framework of the Knowledge, Attitude, and Practice (KAP) model. This model, commonly employed in public health and communication research, allows for a nuanced exploration of how knowledge, attitudes, and behaviors interconnect. By contextualizing the survey outcomes within the KAP model, the study aims to provide a comprehensive understanding of the factors influencing awareness on climate change through social media. Moreover, the survey results will play a pivotal role in hypothesis testing, providing empirical evidence to either support or refute the formulated hypotheses of the study. Through rigorous statistical analysis, the study aims to contribute valuable insights into the effectiveness of social media in fostering awareness about climate change. Ultimately, these findings will not only contribute to the academic discourse on

climate change communication but also offer practical implications for the development of targeted and impactful communication strategies on social media platforms.

3.8 Reliability

Reliability refers to the consistency of your measurement tools. It indicates the extent to which the data collection methods yield stable and consistent results over time. For your study, reliability can be ensured through:

1. **Pilot Testing**: Before the actual data collection, conduct a pilot test of your survey or measurement tool with a small, representative sample of your target population. This helps identify any inconsistencies or ambiguities in your questions.

2. **Internal Consistency**: Use statistical methods to assess the internal consistency of scales used to measure variables, such as Cronbach's alpha for Likert-type scales. A Cronbach's alpha of 0.7 or above is generally considered acceptable.

3. **Test-Retest Method**: For a subset of participants, administer the same survey or measurement tool at two different points in time. High correlation between the two sets of responses indicates good test-retest reliability.

3.8.1 Validity

Validity refers to the accuracy of your measurements, or the extent to which your instruments measure what they are supposed to measure. For your study, focus on:

1. **Content Validity**: Ensure that your survey or measurement tool covers all aspects of the concepts you're investigating. Engage experts in climate change

communication or social media research to review your questions for comprehensiveness and relevance.

2. **Construct Validity**: Establish that your measures accurately reflect the theoretical constructs they are intended to represent. This can involve correlating measures of your constructs (e.g., knowledge, attitudes, and practices) with other established measures of similar constructs to demonstrate convergent validity.

3. **Criterion Validity**: If possible, compare your measures with external criteria known to be indicators of the constructs you're studying. For example, you could correlate self-reported behaviors with actual participation in climate change mitigation efforts, if such data is available.

4. **Face Validity**: Although more subjective, ensure that your measurement instruments appear effective in measuring what they are supposed to measure, not only to you but also to the participants and other stakeholders.

3.9 Addressing Reliability and Validity Issues

- **Clear Definitions and Operationalization**: Ensure that all variables are clearly defined and operationalized, as this directly impacts both reliability and validity.

- **Training for Data Collectors**: If your methodology involves interviews or observations, train your data collectors thoroughly to ensure consistency in data collection.

- **Regular Monitoring**: Throughout the data collection process, regularly monitor data quality and consistency. Address any issues as they arise to maintain reliability and validity.

- **Statistical Analyses**: Utilize appropriate statistical analyses to assess and report the reliability and validity of your measurement tools. Include these analyses in your methodology section to transparently communicate the robustness of your research design.

Incorporating discussions and measures to ensure reliability and validity in your methodology section not only strengthens your study's design but also enhances the credibility of your findings among readers and the broader research community.

CHAPTER NO 4

4.0 Results

4.1 Descriptive Statistics

In this segment, the survey results are critically evaluated to examine the role of social media to Sukkur district community about climate change. The survey observations control the broad range of dimensions like- demographics, social media practices and their knowledge, attitude, and practices in respect to climate change and build relationships within the knowledge, attitude, and practices (KAP) model.

The participants in the survey were divided into different categories such as age, gender, residence, study background, their daily usage of social media and the channels they prefer for signing up on these platforms. **The average participant is a young man with a distance of urban-residential which is be ringed excessively. The survey instrument was distributed among 250 students, split between 200 males and 50 females, resulting in the receipt of 240 responses. Following scrutiny, only 229 responses were deemed to be both fully completed and valid, thus comprising the dataset utilized for the ultimate analysis.**

Table 1: Participant Demographics and Social Media Usage

Participant	Category	Frequency	Percentage (%)
Age	18 – 24	150	65.2
	25 – 34	55	23.9

Gender	Male	193	84.3
	Female	36	15.7
Area	Urban	107	47.8
	Rural	118	52.2
Education	Bachelor's and Above	148	65.5
	Up to Intermediate	52	23.0

The findings indicate that 15.7% of the participants were female, while 84.3% were male. Furthermore, the analysis revealed that 65.2% of the respondents were in the 18-24 age groups, 23.9% were aged between 25-34 years. Additionally, the majority of respondents, constituting 65.5%, were undergraduate and postgraduate students; with the remaining 23% pursuing Intermediate studies (Table 1).

In the course of the survey, participants were inquired about their media inclinations toward Climate-Related Practices. The results disclosed that 90.4% of respondents were inclined towards daily use of social media for checking climate updates. Out of these 57% refer to use Facebook and 43% prefer to use Instagram and others (Table 2).

Table 2: User Engagement and Preferred Platform for Climate Updates

Social Media Usage			
		Frequency	**Percentage (%)**
Users Engagement in Climate-Related Practices on Social Media.		206	90.4

Preferred Platform	Facebook	131	57.0
	Instagram & Others	98	43.0

Most of the participants who still use the social media daily include the Facebook the others are Instagram and others motivates users.

4.2 Knowledge, Attitudes, and Practices (KAP) Regarding Climate Change

To evaluate the Climate change knowledge, attitude, and behavior of the respondents, the survey instrument comprised various questions. These questions were strategically crafted to encompass the dimensions pertinent to these three variables. Specifically, three statements were designed to assess Climate change awareness, four were tailored to gauge climate change attitudes, and four were dedicated to explore behaviors related to climate change.

Table 3: KAP towards Climate Change

KAP Aspect		Strongly Agree & Agree (%)	Neutral (%)	Disagree & Strongly Disagree (%)
Climate Change Awareness	Frequency:	166	43	20
	Percentage:	**71.9%**	**18.0%**	**8.8%**
Attitudes Towards Climate Change	Frequency:	138	63	28
	Percentage:			

		60.6%	**27.2%**	**12.2%**
Behaviors Related to Climate Change	Frequency:	94	81	54
	Percentage:	**40.6%**	**35.6%**	**23.8%**

In Table 3the first research inquiry focused on assessing the levels of climate change knowledge, attitude, and behavior among the respondents. The findings indicated that a notable majority (71.9%) demonstrated an excellent grasp of climate change knowledge, which is an encouraging observation. However, there was a progressive decline observed: the proportion with a favorable climate change attitude was comparatively lower (60.6%), and notably, the level of actual climate change behavior was significantly lower (40.6%).

4.3 Knowledge, Attitudes, and Practices Analysis

Within this section, the attitudes, practices, and knowledge of the Sukkur district's respondents related to climate change are explored as it pertains to social media. This analysis provides an understanding of how climate change information is passed through social media infrastructure, and how it affects the perceptions, attitudes, and practices of the public. Finally, this analysis also describes how social media by providing scientific information can encourage practices that are in line with the mitigation and adaptation of climate change.

Table 4: Respondents' Knowledge on Climate Change

Knowledge Aspect	**Frequency**	**Percentage (%)**
Understand Causes of Climate Change	149	65.1

Familiar with Climate Change Consequences	154	67.3
Knows Climate Change Mitigation Measures	138	60.3

In d adaptation of climate change.

Table 4, the level of knowledge of the respondents is summarized toward various aspects of climate change. Majority of the respondent's manifest awareness on climate change consequences (67%) and causes (65%). On the other hand, mitigation measures resulted to slightly less (60.3%) familiarity suggesting a room to intensify their social media campaigns. Attitudes towards Climate Change

Table 5: Attitudes towards Climate Change

Attitudinal Statement		**Strongly Agree & Agree (%)**	**Neutral (%)**	**Disagree & Strongly Disagree (%)**
Concerned about Climate Change Impacts	Frequency:	98	20	10
	Percentage:	**76.2**	**15.8**	**8.0**
Belief in Collective Action Efficacy	Frequency:	89	28	12
	Percentage:	**69.1**	**21.9**	**9.0**
Support for Climate Policies & Initiatives	Frequency:	93	24	12
	Percentage:	**72.4**	**18.6**	**9.0**

In Table 5, we see the respondents' attitudes about climate change. These include widespread awareness of climate change and strong belief in the ability of collective action

to address the problem. Respondents also strongly endorse a variety of policies and initiatives to address climate change, indicating a high level of agreement on the need for proactive responses to the issue.

Table 6: Climate Change-Related Practices

Practice Statement	Frequency	Percentage (%)
Engaged in Climate Advocacy	98	42.9
Participated in Environmental Conservation Activities	85	37.1
Adopted Sustainable Lifestyle Choices	105	45.9
Shared Climate Information on social media	117	51.1

In oactive responses to the issue.

Table 6, you can see how frequently and in what proportion respondents have engaged in different practices related to climate change. More than half of them seem to have shared information about climate change on social media which can be considered as using platforms to advocate for spreading awareness. Moreover, their adoption of sustainable lifestyle choices and participating in advocacy and conservation activities shows that they have practiced climate change in a considerable level.

4.4 Influence of Social Media on KAP

Table 7: Influence of Social Media on KAP

Influence Aspect		Strongly Agree & Agree (%)	Neutral (%)	Disagree & Strongly Disagree (%)
Increased Knowledge on Climate Change	Frequency:	81	34	12
	Percentage:	**63.4**	**26.6**	**10.0**
Shaped Positive Attitudes towards Climate Action	Frequency:	75	38	14
	Percentage:	**58.9**	**30.1**	**11.0**
Motivated Engagement in Climate-Related Practices	Frequency:	71	42	14
	Percentage:	**55.7**	**33.3**	**11.0**

Table 7 evaluates how social media has affected the understanding of climate change, the formation of attitudes about it, and the preparation for and involvement in action to tackle it. A notable proportion of respondents admit to social media playing a large part in extending their knowledge and promoting green positive attitudes about climate change. Additionally, social media drives many users to take helpful behaviors of climate change mitigation and adaptation.

4.5 Effectiveness of Social Media Campaigns

While delving into the influence of social media on raising awareness and shaping behavior surrounding climate change, the effectiveness of social media campaigns stands out as an area of paramount importance. This portion of the paper will appraise the effects

these campaigns had on the residents of the Sukkur district in regards to reach, engagement, and inciting action against climate change.

Campaign Reach and Awareness

Table 8: Awareness of Social Media Campaigns

Campaign Awareness	Frequency	Percentage (%)
Aware of Any Social Media Campaigns	175	76.5
Not Aware of Any Campaigns	54	23.5

As we can see in Table 8, a considerable majority of the participants are knowledgeable about social media projects connected to climate change. Thus, it is possible to argue that this initiative has a broad coverage in this sampled population.

Table 9: Engagement with Social Media Campaigns

Engagement Level	Frequency	Percentage (%)
Actively Participated	89	38.9
Followed but Did Not Participate	86	37.6

Aware but Not Engaged	54	23.5

Table 9 presents the levels of engagement among the aware of climate change campaigns on social media. A significant number of audiences actively engaged or followed the campaigns; however, quite a portion of them just aware, but did not engage. It indicates campaign design shall be improved to facilitate the interaction more interactively.

Table 10: Types of Content Encountered in Campaigns

Content Type	Frequency	Percentage (%)
Informative (Facts, Data)	142	62.1
Actionable (How-to, Practices)	117	51.1
Storytelling (Personal Stories)	105	45.9
Visual (Images, Videos)	132	57.6

Table 10demonstrates the forms of content that respondents reported encountering within climate change-related social media campaigns. Information and visual forms of content are the most common, but there are also substantial levels of actionable advice and storytelling. The variety in the forms of content is important because climate change campaigns are targeting a wide range of people with different interests and learning styles.

Table 11: Perceived Effectiveness of Social Media Campaigns

Effectiveness Aspect		Strongly Agree & Agree (%)	Neutral (%)	Disagree & Strongly Disagree (%)
Increased Knowledge on Climate Change	Frequency:	88	28	11
	Percentage:	**68.2**	**22.8**	**9.0**
Influenced Attitudes towards Climate Change	Frequency:	82	33	13
	Percentage:	**64.5**	**25.5**	**10.0**
Motivated Actions towards Climate Change	Frequency:	77	39	13
	Percentage:	**59.7**	**30.3**	**10.0**

Table 11 evaluates the perceived efficacy of social media campaigns on knowledge acquisition, attitude change and behavior adoption related to climate change. The majority of respondents acknowledge the contribution of campaigns to knowledge acquisition and attitude shaping, and a remarkable impact can also be seen on behavior adoption.

4.6 Factors Influencing Social Media Effectiveness

In order to create more effective campaigns to communicate climate change through social media, we must understand what factors influence the effectiveness of social media to convey climate change. This section will look into various factors such as type of content. Credibility of the source, user engagement and platform characteristics, and what will contribute the most in achieving the aim of social media campaign to make public more

aware and convinced enough to take action regarding climate change in Sukkur district.

Content Type and Presentation

Table 12: Influence of Content Type on Engagement

Content Type		Highly Engaging (%)	Moderately Engaging (%)	Least Engaging (%)
Informative (Facts, Data)	Frequency:	80	39	10
	Percentage:	**62**	**30**	**8**
Actionable (Guides, Tips)	Frequency:	66	47	8
	Percentage:	**58**	**35**	**7**
Emotional (Stories, Testimonies)	Frequency:	88	32	13
	Percentage:	**65**	**25**	**10**
Visuals (Images, Videos)	Frequency:	91	18	13
	Percentage:	**70**	**20**	**10**

In

Table **12**, one can observe how different types of content relate to social media users. Visual content and emotional storytelling capture a lot of attentive voice, displaying the need and empathy archaeological records and persuasive visuals have in seizing a programming audience's attention and thence a rapport with exhibition.

Table 13: Impact of Source Credibility on Information Trustworthiness

Source Type		High Trust (%)	Moderate Trust (%)	Low Trust (%)
Expert Opinions (Scientists)	Frequency:	97	25	7
	Percentage:	**75**	**20**	**5**
Governmental Sources	Frequency:	77	38	13
	Percentage:	**60**	**30**	**10**
NGOs and Environmental Groups	Frequency:	82	29	7
	Percentage:	**70**	**25**	**5**
Influencers and Public Figures	Frequency:	71	42	13
	Percentage:	**55**	**35**	**10**

The findings in

Table **13** reveal that there are different degrees of confidence accorded to various sources on social media. The expert opinions and environmental NGOs are ranked as highly confident sources. This result means that there is demand for reliable and authoritative voice leading the slope of climate change materials. User Engagement

Table 14: User Engagement Activities and Their Perceived Impact

Engagement Activity		Highly Impactful (%)	Moderately Impactful (%)	Least Impactful (%)
Sharing Content	Frequency:	66	41	13
	Percentage:	**58**	**32**	**10**
Commenting on Posts	Frequency:	65	52	13
	Percentage:	**50**	**40**	**10**
Participating in Polls/Surveys	Frequency:	58	58	13
	Percentage:	**45**	**45**	**10**
Joining Groups/Forums	Frequency:	77	39	13
	Percentage:	**60**	**30**	**10**

According to

Table **14**, there are two kinds of user engagement activities which are considered to be impactful the most in case of the social media campaigns. Sharing the content with others and being the member of specific group or discussion are highly impactful, which suggests that foster a community and convoke the contents are the key strategies to improve the performance of campaigns.

4.7 Statistical Tests

In order to assess the effects of social media platforms on climate change awareness and involvement among the population of the Sukkur District, a number of statistical trials were conducted. The objective of these processes was to identify the significant links between social media utilization patterns and the Knowledge, Attitudes, and Practices (KAP) of climate change that correspond to demographic variables. As such, the methodology and explanations of these trials' outcomes are recorded on this page. Thus, a solid quantitative base is created for assessing how competent social media platforms are as the vehicles of environmental advocacy.

The statistical analysis involved the following key steps:

1. **Correlation Analysis**: To explore the relationships between social media usage frequency, content engagement, and KAP dimensions.

2. **Regression Analysis**: To assess the predictive power of social media engagement and demographic variables on KAP outcomes.

3. **ANOVA (Analysis of Variance)**: To examine the differences in KAP scores across various demographic groups and social media usage patterns.

Data preparation involved coding Liker scale responses, normalizing continuous variables, and categorizing demographic data for ease of analysis. The significance level was set at $\alpha = 0.05$ for all tests

Table 15: Correlation Coefficients between Social Media Usage and KAP Dimensions

Variable	Knowledge	Attitude	Practice

Social Media Usage Frequency	0.32*	0.29*	0.27*
Engagement with Climate Content	0.41*	0.39*	0.35*

*Note: *p < 0.05

In Table 15, the relationship between social media usage, engagement with climate content, and the KAP dimensions is reflected with Pearson correlation coefficients. The more individuals utilize social media and the more individuals get engaged with climate content, the more they gain their knowledge, attitudes, and practices about climate change positively and actively.

Table 16: Summary of Regression Analysis for Predicting KAP Scores

Dependent Variable	**R^2**	**Significant Predictors**
Knowledge	0.25	Social Media Engagement, Education Level
Attitude	0.21	Social Media Usage Frequency, Age
Practice	0.18	Engagement with Climate Content, Gender

The outcomes of multiple regressions that used KAP factors as dependent measures are illustrated in Table 16. Our models discover that social media involvement along with certain demographic aspects significantly foretell the KAP dimensions, giving prominence to 18% and 25% of the different variability. A remarkable fact is that the climate content involvement makes an impressively large prediction across all dimensions of KAP.

Table 17: ANOVA Results for Differences in KAP Scores by Demographic Groups

Factor	Knowledge F-value	Attitude F-value	Practice F-value
Age Group	4.12**	3.89**	2.76*
Gender	5.33**	4.97**	3.64**
Education Level	6.21**	5.78**	4.89**

*Note: *p < 0.05, **p < 0.01

Table 17 presents the ANOVA results, indicating significant differences in KAP scores across various demographic groups. Age, gender, and education level all impact KAP dimensions to varying degrees, with higher education levels consistently associated with higher KAP scores.

4.8 Comparative Analysis

The purpose of this section is to make a comparison and evaluation of the capacity of selected social media platforms in raising climate change awareness and initiating climate change actions among Sukkur district population. By comparing Facebook, Instagram, Twitter, and YouTube, we discover potentials and barriers of these selected social media channels in facilitating climate knowledge acquisition, attitude shaping, and practice adoption about climate change. This comparison is crucial for designing the most effective social media strategy in environmental communication.

Table 18: Effectiveness of Social Media Platforms in Knowledge Dissemination

Platform		Knowledge Score Increase (%)	User Reach (%)	Engagement Rate (%)
Facebook	Frequency:	84	104	98
	Percentage:	**65**	**80**	**75**
Instagram	Frequency:	77	98	90
	Percentage:	**60**	**75**	**70**
Twitter	Frequency:	71	90	84
	Percentage:	**55**	**70**	**65**
YouTube	Frequency:	90	109	104
	Percentage:	**70**	**85**	**80**

In Table 18, the effectiveness of several social media platforms in increasing knowledge about climate change is assessed. YouTube is found to be the most effective social media platform, most likely because it can provide detailed content, followed by Facebook, which attracts a large number of users and maintains strong interaction rate.

Platform Comparison for Attitude Shaping

Table 19: Effectiveness of Social Media Platforms in Shaping Attitudes

Platform		Positive Attitude Shift (%)	Inspirational Content (%)	Interactive Content (%)

Facebook	Frequency:	77	84	90
	Percentage:	**60**	**65**	**70**
Instagram	Frequency:	84	90	98
	Percentage:	**65**	**70**	**75**
Twitter	Frequency:	64	71	77
	Percentage:	**50**	**55**	**60**
YouTube	Frequency:	90	98	104
	Percentage:	**70**	**75**	**80**

The impact of the platforms on users' attitudes towards climate change is explored in Table 19. YouTube and Instagram are particularly successful in promoting positive attitudes, largely due to their ability to deliver up-beat and interactive content.

Table 20: Effectiveness of Social Media Platforms in Encouraging Practices

Platform		**Practice Adoption Rate (%)**	**Actionable Content (%)**	**Community Support (%)**
Facebook	Frequency:	71	77	84
	Percentage:	**55**	**60**	**65**
Instagram	Frequency:	77	84	90
	Percentage:	**60**	**65**	**70**
Twitter	Frequency:	58	64	71
	Percentage:	**45**	**50**	**55**

YouTube	Frequency:	84	90	98
	Percentage:	**65**	**70**	**75**

According to Table 20, the relative effectiveness of each platform in promoting the adoption of sustainable practices regarding climate change is perceived. Of the platforms, YouTube emerges as a leader in practice adoption. Two salient aspects which explain this are the detailed action ability of the content and the strong social support from the YouTube community.

CHAPTER NO 5

5.0 Conclusion, Discussion and Recommendations

Ultimately, the research investigating the impact of social media on raising awareness about climate change among users in Sukkur validates the relevance of the Knowledge, Attitude, and Practice (KAP) model. Social media channels are vital in distributing information and influencing opinions regarding climate change. The results indicate that individuals in Sukkur are actively participating in climate change discourse on social media, acquiring knowledge, cultivating favorable attitudes, and, to a certain degree, integrating environmentally conscious behaviors into their daily routines. Nevertheless, it is crucial to recognize the necessity for ongoing endeavors in improving social media tactics to amplify consciousness and foster enduring behaviors. Collaboration between policymakers, environmental organizations, and social media platforms is necessary to maximize the effectiveness of social media in tackling climate change concerns and promoting a shared dedication to environmental preservation in Sukkur and other areas.

From the research conducted, the opinions of people who participated are scared and aware about global warming. Majority of the respondents had received information about what climate change is and most of them thought were accurate. Respondents seem to have understood all three main areas where previous researchers on climate change come to a consensus — the nature and causes of climate change, the consequences of previous and future climate change and the solution to climate change. There may be have a gap in what response think about effect of geography per all causes, hence, social media can be used in ensure all people to understand all area of global warming. The attitudes to climate change are mainly positive and strongly believe in the important and influence of collective action

and support policy. Furthermore, in this community having good attitude among people is much important. A large percentage of the respondents are already taking action towards climate change mitigation and adaptation through advocacy and conservation activities, sustainable lifestyle choices, and sharing of information on social media platforms which provides an assurance in practicing on the ground actions that can be harnessed and amplified through strategic social media campaigns. It is clear that; social media has significant roles to play in increasing knowledge in climate science, attitude towards climate change and behavior that can mitigate climate change. Knowledge gap especially in actionable mitigation is therefore a critical area content creators and campaigners on climate change need to focus in addition to continue fostering a positive and proactive community that is ready to engage in meaningful climate actions.

Implications of Findings

When discussing the implications of findings from a study on the role of social media in raising climate change awareness in Sukkur, Sindh, Pakistan, it is essential to compare them with similar studies conducted in other regions. This comparison helps to contextualize the results and understand the broader patterns and variations in the effectiveness of social media as a tool for environmental awareness.

Effectiveness of Social Media in Different Contexts

In many studies, social media has been found to be a powerful tool for raising climate change awareness, particularly among younger populations and in urban areas. For example, research in the United States and Europe has shown that platforms like Twitter, Facebook, and Instagram play a crucial role in disseminating information about climate change, mobilizing environmental activism, and fostering public discussions (Marlow, 2018;

Hestras, 2014). However, these studies often focus on regions with high internet penetration and widespread social media usage, which may not be directly comparable to the context in Sukkur, where access to digital platforms may be more limited.

In contrast, studies from regions with similar socioeconomic and technological conditions to Sukkur, such as parts of Sub-Saharan Africa and Southeast Asia, have highlighted the challenges of using social media for climate change communication. For instance, in rural Kenya, limited internet access and lower levels of digital literacy have been significant barriers to the effectiveness of social media campaigns on environmental issues (Osiemo, 2019). Similarly, research in rural Indonesia has pointed out that while social media can raise awareness among urban populations, it has less impact in rural areas due to limited reach (Mulyadi et al., 2020).

Socioeconomic and Cultural Differences

The socioeconomic and cultural context of a region significantly influences the effectiveness of social media in raising climate change awareness. In more developed regions, where environmental issues are often a part of public discourse and education systems, social media campaigns can build on existing knowledge and concern. For example, in Scandinavian countries, where there is already high environmental awareness, social media has been used effectively to promote sustainable behaviors and mobilize collective action (Hestras, 2014).

However, in regions like Sukkur, where climate change may not be as prominently discussed in education or the media, social media's role might be more foundational, serving

as one of the primary sources of information on the topic. Studies in India and Bangladesh have shown that while social media can introduce and disseminate climate change information, the impact is often moderated by local cultural values, literacy levels, and trust in traditional media (Arora &Sood, 2020; Haque et al., 2019). In such contexts, social media might be more effective when integrated with local communication methods, such as community meetings or radio broadcasts.

Digital Divide and Access Issues

The digital divide is a critical factor influencing the role of social media in climate change awareness. In regions like Sukkur, where internet access might be unevenly distributed, the potential for social media to raise awareness is limited by who can access these platforms. This challenge has been observed in studies from various low- and middle-income countries. For example, in Nigeria, research has shown that while social media can reach urban, educated populations, it has much less influence in rural areas where internet access is scarce (Okoro&Nwafor, 2019). Similarly, in South Africa, the digital divide has resulted in unequal access to climate information, with wealthier, urban populations being more informed and engaged than their rural counterparts (Mare, 2020).

Comparative Analysis of Engagement Strategies

Comparing the findings from Sukkur with other regions also highlights the importance of tailoring social media strategies to local contexts. In regions where social media is effective in raising climate change awareness, successful strategies often involve interactive and visually engaging content, such as infographics, videos, and live discussions. For instance, in Brazil, environmental NGOs have used social media campaigns that combine

local language content with engaging visuals to successfully raise awareness about deforestation and climate change (Milanez& Santos, 2018).

In contrast, in regions like Sukkur, where literacy rates may be lower and visual or audio content might be more impactful, social media campaigns might need to prioritize multimedia content over text-heavy posts. Additionally, partnering with local influencers who have credibility within the community could enhance the effectiveness of these campaigns, as seen in studies from other parts of South Asia (Arora &Sood, 2020).

Implications for Policy and Practice

The broader implications of these findings suggest that while social media has the potential to be a valuable tool for raising climate change awareness, its effectiveness is highly context-dependent. In regions like Sukkur, policymakers and practitioners should consider a mixed-method approach that combines social media with more traditional forms of communication, such as community outreach programs or collaboration with local leaders. This approach can help bridge the digital divide and ensure that climate change information reaches a wider audience.

Moreover, as seen in other regions, governments and NGOs in Sukkur could benefit from investing in digital infrastructure and education to improve internet access and digital literacy. This would not only enhance the effectiveness of social media campaigns but also empower more people to participate in climate change discussions and actions.

Comparing the findings from Sukkur with similar studies in other regions underscores the importance of contextual factors in determining the effectiveness of social media as a tool for climate change awareness. While social media can play a crucial role in spreading information and mobilizing action, its impact is mediated by access, cultural factors, and local communication practices. Tailoring strategies to these contexts and integrating social media with other communication methods will be essential for maximizing its potential in raising climate change awareness globally.

5.1 EFFECTIVENESS OF SOCIAL MEDIA CAMPAIGNS

While delving into the influence of social media on raising awareness and shaping behavior surrounding climate change, the effectiveness of social media campaigns stands out as an area of paramount importance. This portion of the paper will appraise the effects these campaigns had on the residents of the Sukkur district in regards to reach, engagement, and inciting action against climate change.

Campaign Reach and Awareness

The data analysis reveals a large reach of social media campaigns on climate change, with a high level of climate change awareness among respondents. Despite significant levels of engagement, there is room for campaigns to increase active participation, such as through interactivity elements or incentives within campaigns. The variety in campaign content, from informative to visual and storytelling indicates a broad strategy meant to reach diverse audiences. These multiple campaign content types are necessary for capturing the layered and complex nature of climate change, providing both the context and call to action that moving towards change necessitates. The distinct effectiveness of these campaigns in increasing knowledge and shaping attitudes is significant, demonstrating that social media has the potential to be influential in the environmental communication field. However, the

percentage of respondents who were slightly motivated to act is lower, pointing to a key disconnect between awareness and action, which is a challenging in environmental communication. The comparison analysis showed a big difference in how effective different social media platforms are at the following: promoting awareness of climate change, shaping attitudes about climate change, encouraging support for mitigation strategies and encouraging personal action on sustainable practices. The best platform to disseminate knowledge is YouTube because of its format allowing for longer, more detailed content. Facebook also does well because of how wide of an audience it reaches and high user engagement.

To further support the findings on the effectiveness of social media campaigns in raising climate change awareness, it's essential to incorporate quantitative data and statistics from various studies. These figures help to substantiate the argument and provide a clearer picture of the impact of social media across different regions.

Global Reach and Engagement

Social media platforms have a vast global reach, making them powerful tools for disseminating information about climate change. As of 2023, Facebook has approximately 2.96 billion monthly active users, while Instagram has over 2.35 billion, and Twitter (now X) has around 396.5 million users globally (Statista, 2023). This wide user base provides significant opportunities for climate change campaigns to reach diverse audiences.

Studies have shown that social media campaigns can effectively engage large audiences. For example, a study by GlobalWebIndex (2020) found that 61% of internet users in North America and 54% in Europe had seen or engaged with climate change content on

social media in the past year. This highlights the platforms' ability to spread environmental messages widely.

Impact on Awareness and Behavior

Quantitative studies have also demonstrated the impact of social media campaigns on climate change awareness and behavior. A survey conducted by Pew Research Center (2021) found that 72% of U.S. adults who use social media believe that platforms like Facebook and Twitter help raise awareness about climate change. Additionally, 47% of users reported that they had taken some form of action (e.g., sharing content, donating to environmental causes) after encountering climate change information on social media.

In Europe, a study by the European Commission (2022) found that 65% of respondents who were exposed to climate-related content on social media reported an increase in their awareness of climate issues, and 35% reported that they had changed their behavior as a result (e.g., reducing plastic use, supporting renewable energy).

Regional Comparisons

Quantitative data from different regions further highlights the varying effectiveness of social media campaigns. In a study conducted in India, 45% of social media users reported that platforms like WhatsApp and Facebook were their primary sources of information on climate change, compared to only 15% who cited traditional media like television or newspapers (Arora &Sood, 2020). This shows the growing importance of social media in raising awareness in regions where digital media is becoming more dominant.

In contrast, in Sub-Saharan Africa, a study by the African Climate Foundation (2021) found that while 56% of urban social media users had encountered climate change content online, only 22% reported a significant increase in awareness. This lower impact is partly attributed to the digital divide and varying levels of education and literacy, highlighting the need for more targeted campaigns in such regions.

Effectiveness in Mobilization and Advocacy

Social media's role in mobilizing action on climate change is supported by quantitative evidence. For instance, during the 2019 Global Climate Strikes, over 7.6 million people participated in protests across 185 countries, with much of the mobilization attributed to social media campaigns led by movements like Fridays for Future and Extinction Rebellion (Fridays for Future, 2019). These campaigns used hashtags like #ClimateStrike and #FridaysForFuture to organize events, with millions of posts shared across platforms.

A study by C40 Cities (2021) found that cities where social media campaigns were actively promoted saw a 25% higher turnout in climate-related events compared to those that relied solely on traditional media. This demonstrates the effectiveness of social media in driving large-scale participation in environmental activism.

Challenges and Limitations

Quantitative data also sheds light on the challenges faced by social media campaigns in certain regions. In Pakistan, for example, a survey by Gallup Pakistan (2020) revealed

that while 80% of internet users had access to social media, only 30% reported regularly engaging with climate change content. This indicates that while access to social media is widespread, its use for environmental advocacy may still be limited, possibly due to other competing interests or lower prioritization of climate issues.

Quantitative data underscores the effectiveness of social media campaigns in raising climate change awareness and driving action, particularly in regions with high internet penetration and digital literacy. However, it also highlights the challenges in areas with limited access and varying levels of engagement. By integrating this data with qualitative findings, researchers and practitioners can develop more targeted and effective social media strategies to address climate change across different contexts.

5.2 Best Practices and Recommendations

Based on the research on the effectiveness of social media in increasing climate change awareness and engagement in the district of Sukkur, the following section proposed a set of best practices and recommendations. These guidelines are meant to enhance the design and implementation of future social media campaigns, so as to effectively educate, encourage and activate the public on climate actions.

Table 21: Content Strategy Recommendations

Content Type	Best Practice	Example Applications
Informative	Incorporate latest scientific findings and statistics	Info graphics on climate trends, explainer videos

Inspirational	Share success stories and positive outcomes from climate actions	Stories of community-led conservation projects
Actionable	Provide clear, practical steps for individual and collective action	Guides on reducing carbon footprint, recycling tips
Interactive	Engage users through polls, quizzes, and challenges	Climate action challenges, interactive webinars

Table 21 emphasizes the importance of diverse content types in engaging a broad audience. Informative content builds a knowledge base, inspirational stories foster motivation, actionable advice encourages real-world application, and interactive elements enhance user engagement.

Table 22: Engagement and Community Building Strategies

Strategy	Best Practice	Example Applications
Personalization	Tailor content to resonate with different demographics	Customized content for various age groups, interests
Community Forums	Create spaces for discussion and sharing	Facebook groups, Twitter chats on climate topics
User-Generated Content	Encourage sharing of personal stories and actions	Hashtag campaigns for sharing climate actions
Feedback Mechanism	Implement channels for user feedback and suggestions	Surveys, comment sections for direct user interaction

Table 22 outlines strategies for enhancing audience engagement and fostering a sense of community. Personalization ensures content relevance, community forums provide platforms for exchange, user-generated content leverages the power of personal narratives, and feedback mechanisms ensure campaigns remain responsive to audience needs.

Table 23: Social Media Platform Utilization Guidelines

Platform	Optimization Strategy	Example Applications
Facebook	Leverage groups and live features for community building	Live Q&A sessions, climate action groups
Instagram	Use stories and reels for quick, impactful messages	Climate quotes in stories, reels on easy eco-tips
Twitter	Utilize hashtags to amplify reach and engagement	Campaign-specific hashtags, Twitter threads on climate topics
YouTube	Create detailed, educational content	Documentary-style videos on climate issues, how-to guides

Table 23 provides guidelines for effectively utilizing different social media platforms. Each platform's unique features should be leveraged to maximize content reach and impact, from Facebook's community-building capabilities to YouTube's potential for in-depth educational content.

Table 24: Framework for Campaign Monitoring and Adaptation

Component	Best Practice	Example Applications

Analytics	Regularly review platform analytics for insights	Tracking engagement metrics, audience growth
User Feedback	Actively seek and incorporate user feedback	Surveys, comment analysis for content improvement
Campaign Adaptation	Adjust strategies based on performance and feedback	Content recalibration, platform focus shifts
Impact Assessment	Evaluate campaign impact on knowledge, attitudes, practices	Pre- and post-campaign surveys, KAP studies

Table 24 emphasizes the importance of ongoing monitoring and adaptation in campaign management. Analytics and user feedback should inform continuous refinement of campaign strategies, ensuring they remain effective and aligned with audience needs and preferences.

When developing best practices and recommendations for improving the effectiveness of social media campaigns in raising climate change awareness, it is crucial to prioritize those strategies that will have the most significant impact. Below, it has been prioritized recommendations, beginning with the most critical:

Enhance Digital Literacy and Access (Most Critical)

Why Critical: Limited digital literacy and internet access are significant barriers, especially in regions like Sukkur, Sindh. Without addressing these foundational issues, even the most well-designed social media campaigns may fail to reach or engage the intended audience.

Action: Governments, NGOs, and stakeholders should invest in expanding internet infrastructure, especially in underserved areas. Additionally, digital literacy programs should be prioritized to ensure that more people can effectively use social media platforms.

Impact: By enhancing digital access and literacy, a broader segment of the population will be able to engage with climate change content, thereby increasing the reach and effectiveness of social media campaigns.

Tailor Content to Local Contexts

Why Critical: Cultural relevance and local context are key to the success of social media campaigns. Generic, one-size-fits-all content may not resonate with local populations,

limiting its impact.

Action: Campaigns should use local languages, incorporate culturally relevant themes, and address region-specific climate challenges. Collaborating with local influencers who have credibility and trust within the community can also boost engagement.

Impact: Tailored content is more likely to capture attention and inspire action, increasing the campaign's overall effectiveness.

Utilize Multimedia Content and Interactive Formats

Why Important: Visual and interactive content, such as videos, infographics, and quizzes, tend to engage users more effectively than text-heavy posts, particularly in regions with lower literacy rates.

Action: Prioritize the use of engaging multimedia formats that simplify complex climate concepts. Incorporate interactive elements, such as polls or challenges, to encourage active participation.

Impact: Enhanced engagement through multimedia and interactive content can lead to better understanding and retention of climate change information, motivating behavioral change.

Leverage Partnerships with Local Organizations

Why Important: Local organizations often have a better understanding of the community and can help bridge the gap between social media campaigns and on-the-ground realities.

Action: Partner with local NGOs, schools, and community groups to co-create content, amplify messages, and organize offline activities that complement online efforts.

Impact: By leveraging local networks, campaigns can achieve greater reach and trust, ensuring that climate change messages resonate more deeply within the community.

Segment Audiences and Customize Messaging

Why Important: Different segments of the population may respond differently to various messages, so customization is crucial for maximizing impact.

Action: Use social media analytics to identify and segment the audience based on demographics, interests, and online behavior. Develop targeted messaging that speaks directly to each group's concerns and values.

Impact: Customized messaging ensures that the content is relevant to different audience segments, increasing the likelihood of engagement and action.

Promote Two-Way Communication

Why Important: Social media is most effective when it facilitates dialogue rather than just broadcasting information. Two-way communication builds trust and encourages more meaningful engagement.

Action: Encourage comments, questions, and discussions on social media platforms. Respond to feedback, and create opportunities for users to share their own climate-related experiences and ideas.

Impact: A more interactive approach fosters a sense of community and shared responsibility, making individuals more likely to take collective action on climate change.

Monitor and Evaluate Campaign Performance

Why Important: Continuous monitoring and evaluation are necessary to measure the effectiveness of social media campaigns and make data-driven adjustments.

Action: Utilize social media analytics tools to track metrics such as reach, engagement, and conversion rates. Conduct regular surveys or focus groups to gather qualitative feedback.

Impact: Monitoring and evaluation allow for the identification of successful strategies and areas for improvement, ensuring that campaigns remain relevant and effective over time.

Integrate Online Campaigns with Offline Activities

Why Valuable: While social media is a powerful tool, its impact can be amplified when combined with offline activities such as community events, workshops, or local media coverage.

Action: Use social media to promote and organize offline activities that complement the campaign's goals. Ensure that online messages are reinforced through real-world actions and initiatives.

Impact: Integration with offline activities provides multiple touchpoints for engagement, increasing the likelihood of sustained awareness and action.

Adapt to Emerging Trends and Technologies

Why Valuable: Social media platforms and user behaviors are constantly evolving, so campaigns must remain adaptable to stay relevant.

Action: Stay informed about emerging social media trends and technologies, such as new platforms, features, or content formats (e.g., short-form video, live streaming). Experiment with these innovations to see what resonates best with the target audience.

Impact: Adapting to trends ensures that campaigns remain fresh and engaging, maintaining audience interest and participation. Prioritizing these recommendations can help maximize the effectiveness of social media campaigns in raising climate change awareness. Enhancing digital literacy and access, tailoring content to local contexts, and leveraging multimedia content are the most critical steps to ensure broader reach and engagement. By following these best practices, stakeholders can design and implement more impactful campaigns that drive meaningful action on climate change.

Implementing Recommendations and hallenges

Implementing the prioritized recommendations for enhancing the effectiveness of social media campaigns in raising climate change awareness can be challenging, especially in regions like Sukkur, Sindh, Pakistan. Below, I discuss the potential challenges and propose strategies to overcome them.

Challenge: Limited Digital Literacy and Access

Expanding internet access and improving digital literacy in underserved areas like Sukkur can be resource-intensive. Infrastructure development requires significant financial investment, and digital literacy programs need trained personnel and time to reach remote communities.

Overcoming Strategy:

Partnerships: Collaborate with government agencies, NGOs, and private companies to fund and implement digital infrastructure projects. Public-private partnerships can be particularly effective in mobilizing resources.

Community-Based Approaches: Engage local leaders and influencers to promote digital literacy. Training programs should be culturally sensitive and delivered in local languages to ensure accessibility.

Phased Implementation: Start with pilot projects in selected areas and gradually scale up as resources become available. Prioritize areas with the highest potential for impact.

Challenge: Cultural and Contextual Differences

Creating content that resonates with local audiences requires deep cultural understanding, which can be challenging for external organizations or campaign designers unfamiliar with the region.

Overcoming Strategy:

Local Partnerships: Work closely with local NGOs, community leaders, and influencers who have a better grasp of the cultural context. Co-create content with them to ensure it is relevant and resonates with the target audience.

Continuous Feedback: Implement mechanisms for ongoing feedback from the local community, such as focus groups or social media polls, to adjust content and messaging in real time.

Challenge: Resource Constraints for Multimedia Content

Producing high-quality multimedia content can be expensive and time-consuming, especially for organizations with limited budgets. This is particularly challenging in regions with fewer content creators or production resources.

Overcoming Strategy:

Leverage User-Generated Content: Encourage the community to create and share their own content related to climate change. User-generated content can be cost-effective and often more relatable to local audiences.

Utilize Low-Cost Tools: Take advantage of free or low-cost tools for creating multimedia content. There are various online platforms for creating infographics, videos, and interactive content without requiring advanced technical skills.

Collaborate with Local Creators: Partner with local content creators who may be more affordable than external agencies and who understand the local culture and context better.

Challenge: Difficulty in Segmenting Audiences

Segmenting audiences effectively requires access to detailed data and advanced analytics tools, which might not be readily available or affordable, particularly for smaller organizations.

Overcoming Strategy:

Use Platform-Specific Tools: Social media platforms like Facebook and Instagram offer built-in analytics and audience segmentation tools that are accessible to most users. Utilize these tools to target campaigns more effectively.

Simplify Segmentation: If advanced tools are not available, simplify segmentation by focusing on broader demographic categories such as age, location, or language, and tailor content accordingly.

Challenge: Sustaining Two-Way Communication

Maintaining ongoing, meaningful dialogue with users can be resource-intensive, requiring dedicated staff to monitor platforms, respond to comments, and engage in discussions.

Overcoming Strategy:

Automate Where Possible: Use chatbots or automated responses for frequently asked questions or routine interactions to reduce the burden on human staff. However, ensure that there are clear pathways for users to engage with real people for more complex queries.

Community Moderators: Recruit and train community volunteers or local influencers to help manage and facilitate discussions on social media platforms. This can distribute the workload and enhance engagement.

Challenge: Monitoring and Evaluation Difficulties

Regularly monitoring and evaluating the effectiveness of social media campaigns can be challenging, especially when dealing with qualitative data or when resources for comprehensive analytics are lacking.

Overcoming Strategy:

Set Clear, Measurable Goals: Define specific, measurable objectives for the campaign (e.g., number of shares, comments, or behavioral changes) to make monitoring easier and more focused.

Use Free Analytics Tools: Leverage free or low-cost analytics tools provided by social media platforms, such as Facebook Insights or Twitter Analytics, to track basic metrics. Supplement this with occasional surveys or feedback forms to gather qualitative data.

Iterative Approach: Implement a cycle of continuous improvement, where campaigns are adjusted based on regular feedback and performance data. This allows for ongoing optimization even with limited resources.

Challenge: Integrating Online Campaigns with Offline Activities

Coordinating online and offline activities can be logistically complex and resource-intensive. Additionally, reaching rural or remote areas for offline engagement may pose significant challenges.

Overcoming Strategy:

Localized Events: Partner with local organizations to host small-scale, community-specific events that complement online efforts. These events can be more manageable than large-scale initiatives and can be promoted through social media.

Cross-Promote: Use online platforms to advertise offline activities and vice versa. Encourage participants in offline events to engage online by sharing their experiences, photos, or videos, thus creating a seamless connection between the two.

Focus on High-Impact Areas: Prioritize integrating online and offline efforts in areas where the potential impact is highest, such as urban centers or regions with high social media usage.

Challenge: Adapting to Emerging Trends

Details: Keeping up with rapidly changing social media trends and technologies can be difficult, especially for organizations with limited resources or technical expertise.

Overcoming Strategy: Continuous Learning: Invest in ongoing training for staff to stay updated on the latest social media trends and tools. This could include attending webinars, participating in online courses, or collaborating with more tech-savvy partners.

Experiment and Iterate: Be willing to experiment with new formats or platforms on a small scale before fully committing to them. This allows you to test their effectiveness without significant risk or resource investment.

While implementing these recommendations comes with challenges, they can be addressed through strategic partnerships, leveraging local resources, and adopting scalable, cost-effective approaches. Prioritizing key areas like digital literacy, cultural relevance, and audience engagement will ensure that social media campaigns have a more significant impact, even in resource-constrained settings.

5.3 Strategic Recommendations

In conclusion to the analysis and best practices listed, the strategic recommendations provided below aim to maximize the success of future campaigns on climate change. Diversify Content Strategy: Make repertoire of Informatory, Inspiring, Interactive and How-To type of contents to cater to various learning style and tastes of users. Encourage active community engagement: Develop and grow user and customer communities by creating personalized content, interactive forums and user generated content initiatives to encourage customer dialogue, increase learning and assist in sharing experiences. Optimizing for Platform Strengths Tailor campaign content and engagement strategies to get the most out of each platform's strengths and audience demographics. Employ Agile Campaign

Management. Keep campaigns fresh, on-target and highly effective by monitoring progress, gathering user input and adapting as indicated by input and results. Assess and Report Impact: Periodically evaluate the impact of the communication campaign on people's knowledge, attitudes, and practices, sharing the findings to earn credibility and support for climate initiatives.

Ethical and Reliability Considerations

It is an ethical requirement for the researchers presenting study of qualitative research on the use of social media for awareness and engagement on climate change related issues in Sukkur to maintain the reliability of the results and present the study as it has been conducted so during the conduction of the research, an attempt was made on authors parts to fulfill all these requirements of the proposed framework. Also=saw if there are people how have interest in the issue of climate change and how they engage them to mitigate this situation. Therefore, in this part I will discuss the ethical consideration taken into account throughout the research. Different Ethics Participant Consent and Anonymity are the principle of informed consent was a key for conducting research. Consent was obtained through requiring clear actions from participants to ascertain they had been informed of; the purpose of the research, their involvement in the research and what data will be collected from them. They were also informed in these how: their decision to be a part of the study was not to hold any personal consequences, that they are able to withdraw from the research at any stage and that their files will be anonymized where personal identifiers will be removed or altered to ensure there is no possible way participants can be identified through any data retained.

The first consideration in this research which adds to the trustworthy of the research is that the research was carried out transparently. The participants were informed about the

objective, which the research intends to achieve and also the likely consequences, which may perhaps be drawn from the findings of this research. This openness brings about trust in participants and it also gives them upper hand in choosing whether to be part of this research or not. Avoidance of Harm: The design was arranged in such a way that participants were not likely to be caused distress or discomfort. The questions asked, particularly around climate change were approached sensitively, avoiding making participants' anxious or upset. Moreover, the survey was digital, lowering the risks of any physical harm. Data Security and Confidentiality: To ensure that your responses are kept anonymous and your basic day to day Internet usage is kept private, each completed questionnaire will be given a separate database reference number and will be inputted into a database in the current CRA survey tool. We also have a secure data plan in place. All of the data was transmitted very securely and was encrypted and of course only viewed by authorized members. The commitment to data protection enforcement was made known to the individuals before the survey to reassure responses that there are secure and their personal information is being kept secure. Reliability No matter how much care was taken when collecting the data there is always the chance that the data could be unreliable. In this case a lot of consideration was made to try and keep the data as reliable as possible. First of all, for data collection consistency, it was ensured that the way in which the data was collected is consistent. It was ensured by setting out standardized data collection procedures. It also ensured that the online survey was designed to be user friendly and easy to access and use to decrease the risk of the participants misinterpreting the questions or given the wrong answer; this could have made the data unreliable as the answers may have been inconsistent. During the creation of the online survey the survey was also piloted to help identify any problems that could have made the survey hard to understand which helped to stop the answers from being inconsistent.

Statistical Validity: An appropriate range of techniques have been employed. The techniques employed have been correctly identified, and they have been applied with a degree of skill involved. A respected statistical package programmed has been used to analyses the data. All of the stated assumptions inherent in any of the tests has been checked and unless than stated, has been satisfied and therefore the test has been applied correctly. Furthermore, the result of each test has been interpreted within the limits of the assumptions as a failure to meet the assumptions would render the test invalid.

Triangulation of Data: Where possible, data were triangulated in order to enhance the credibility of the results. Data triangulation involved the use of different sources and or techniques or observations in the study (Kristi and Iram, 2011) for e.g. Thinning of the case study, qualitative comments of the participants in the Likert scale and quantitative data provided from the study. Triangulation of data provided more depth and width to the study or research problem. Limitations/Reflexivity Limitations were consciously discussed and recognized. The topics discussed were the sample size, the usefulness of the results on adolescence, participant selection, and bias. Alongside limitations, the group embraced reflexing to make sure personal biases and backgrounds do not hinder the research process and objectiveness. To have consequential research, one must begin with ethical considerations and reliability. In this research, ethical research practices were vigorously touched on and considered strongly when discussing the effectiveness of social media in the promotion of climate change awareness and engagement. There must first be the consideration of the human subjects' consent in taking part in this research. Following the consent of all the people, their identity must be taken into consideration and they must all retain the right to remain anonymous in as long as the research exists. Furthermore, transparency and honesty are a much-needed approach to the ethics of any research and it

can therefore be gathered safely that honesty being so tightly connected with the idea of ethical research, it was a focal point in the conduct of this particular research. No harm could come to people in this research, and although a survey, it was done in a way as to protect the people involved from all public ridicule and hazard. Lastly for keeping the data confidentiality, none of the participant's data was violated or distributed anywhere. Reliability is a great partner for ethical research and practices. Finding reliable results is important in influencing another in the fore created research of social media and the efforts to get people thinking of climate change. Data collection had to consistent, similar to making a commitment to always collect the same type of data, for the 10 plus questions over the 100 plus people each book used the same questions, this enhanced reliable findings. So do people believe that social media is a good story teller and promoter of climate change. Another way to reliable is by statistics, as found that throughout the findings the use of statistics was typically shown, but in this and the following research there seems to have been a lack of statistical data. It furthers more interesting research in seeing that data triangulation is a strong asset in this particular research study. In essence, all books formed a cohesive unit, agrees and concurs with one another, moreover the conclusion of that matter agrees with all the books. Finally, however flaws and limitations have been found, the research reflects on how the future could be fixed, planning remarkable research ideas.

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The survey which was formulated is as following:

"Role of Social Media in Creating Awareness on Climate Change:

"Testing the KAP Model in Sukkur"

Dear Participants,

*My name is **Shafquat Ali** and I am a master's student of **International Islamic University Islamabad**. My research topic is **" Role of Social Media in Creating Awareness on Climate Change. Testing the KAP Model in Sukkur"**. Your participation in this research would be appreciated. Your responses will be kept confidential, and your identity will be protected throughout the research process. Data will be used for research purposes only.*

Demographic Information:

Demographic Information:

1. **Age:** 18-24 ☐ 25-34 ☐ 35-44 ☐ 45 or Above ☐

2. **Gender:** Male ☐ Female ☐

3. **Area:** Rural ☐ Urban ☐

4. <u>Education Qualification:</u>

Matriculation ☐ Intermediate ☐ Bachelor ☐

MS/M.Phil. ☐ PhD. ☐

5. How often do you use social media platforms?

Daily ☐ weekly ☐ Monthly ☐

Rarely ☐

6. Which social media platforms do you use most frequently?

Facebook ☐ Twitter ☐ Instagram ☐

YouTube ☐ Tiktok ☐

#	Statement	Agree	Strongly Agree	Neutral	Disagree	Strongly Disagree
7.	I am aware of climate change and its impact.					
8.	Social media has increased my awareness of climate change.					
9.	I follow social media accounts or pages related to climate change.					

10.	I feel well-informed about the causes and effects of climate change due to content on social media.					
11.	Social media platforms effectively communicate the urgency of addressing climate change.					
12.	I believe that social media can be a powerful tool for raising awareness and mobilizing action on climate change.					
13.	Social media plays a crucial role in shaping my attitude towards addressing climate change.					
14.	I believe that climate change is a serious global issue.					
15.	Social media can be an effective platform for addressing climate change issues.					
16.	I feel motivated to take action on climate change after seeing social media content.					
17.	I believe that my social media activities can contribute to a positive impact on climate change.					
18.	I am optimistic about the potential for social media to mobilize collective action against climate change.					
19.	I have taken actions in my daily life to reduce my carbon footprint (e.g., reducing energy consumption, using public transport).					
20.	I have shared climate change-related content on social media.					
21.	I have participated in climate change awareness campaigns or activities as a result of social media influence.					

22.	I have personally attended events or conferences related to climate change.					
23.	I have actively engaged in online discussions or debates about climate change on social media.					
24.	I have made financial contributions to climate change organizations or causes.					
25	I believe that social media has the potential to influence positive change regarding climate change awareness and actions.					
26.	I see climate change-related posts on your social media feeds.					
27.	I think that social media interactions have influenced others to become more aware of climate change issues.					
28.	I Would be willing to join or support a social media campaign focused on climate change.					
29.	I primarily get information on climate change through social media.					
30.	I trust information about climate change that I find on social media.					
31.	Social media has made me more optimistic about addressing climate change.					
32.	Social media has made me pessimistic about addressing climate change.					