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The Role of Generative AI in Proactive Community Engagement: Developing Scalable Models for Enhancing Social Responsibility through Technological Innovations

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Generative AI (GAI) tools are becoming common when creating text, images, and audio. The spread of GAI may constitute relevant social changes that need to be questioned, particularly regarding the nodes of society responsible for the common good, public interest, and social responsibility. A debate is taking shape around possible GAI social effects, with both optimistic and pessimistic positions. Today, attention is focused on how to channel GAI media into civic engagement and public deliberation. A research agenda is proposed to employ GAI for proactive community engagement across local government, civic society, and academic knowledge. Three empirical cases are presented: GAI is used to examine deliberative democracy in a local council, develop dialogue experiments on food safety resilience, and create civic e-petition narratives to enhance youth participation in democracy. While GAI is intensely debated, attention primarily focuses on the media's social effects. Inmediatank tries to shift attention from the media's social impact to society's responsibility for the media's role. Following the emergence of media with potentially significant social consequences, this approach asks: what proactive societal adjustments do these media innovations spur? Is it fair to expect society to improve the social role of media innovations beforehand? Inmediatank posits that society's proactive role in harnessing media innovations for the common good should be expected alongside the media's impact. This proposition is examined in light of recent GAI developments.

Keywords: Generative AI,Community Engagement,Social Responsibility,Technological Innovations,Scalable Models,Data-Driven Decision Making,Ethical Considerations,Inclusive Engagement,AI-Powered Platforms,Public-Private Partnerships.

1. Introduction

The purpose of this study is to explore the social opportunities of generative AI proactively addressing community engagement needs and developing scalable models that help civic tech practitioners design generative AI applications that enhance social responsibility. The goal is to democratize and disseminate knowledge on generative AI's social opportunities by sharing initial models, prototypes, and co-design approaches. This research contribution combines community co-designs and early generative AI applications in the social domain: an outreach

letter generation tool for a children's literacy nonprofit, a script generator for an experimental video series on Fennel's community roots, and a discussion facilitator for a youth engagement think tank. These prototypes help brainstorm how generative AI's text, audio, and video modalities can add value to community engagement efforts in arts, education, policy, and activism settings while considering challenges in ethics, equity, and accountability. Together with the community co-design approach, these prototypes aim to seed discussion and inspire further exploration of generative AI's role in fostering community engagement and social responsibility.

In recent years, large language models (LLMs), a class of generative AI, have gained significant attention for their ability to generate human-like text and other forms of content. These models are trained on vast amounts of data, allowing them to learn patterns in language and generate coherent and contextually appropriate responses to input prompts.

Fig 1 : Emerging use cases of Generative AI in automation

The advent of commercial products like ChatGPT and Bard has sparked a renewed interest in the societal impact of generative AI. Concerns about the accuracy, bias, privacy, and transparency of these technologies closely mirror earlier debates on algorithmic decision-making and platform governance in social media. However, generative AI also opens up new opportunities due to its unique characteristics. As companies and organizations increasingly adopt generative AI tools, thoughts and frameworks for understanding the social impact of these technologies are needed. In particular, perspectives on how generative AI can contribute to community engagement and social responsibility are currently absent.

1.1. Background and Rationale

Recently, ChatGPT has taken on the role of a digital oracle, similar to the Delphic oracle of ancient Greece. Inhabitants of that society approached the oracle with questions, and the ambiguous answers were interpreted in various ways, solving some uncertainties while generating others. Models like ChatGPT personalize the digital version of the Delphic oracle,

where people expect to find answers to their current problems. It is essential to question whether, as a society, we are genuinely resolving uncertainties or uncovering new ones regarding the societal impact of generative models. Generative AI is currently undergoing a period of accelerated evolution, bringing about social impacts akin to other technological advancements. While the previous waves of internet-related technologies led to generative AI's earlier emergence, there has been an unprecedented acceleration in their development and mass availability since 2022.

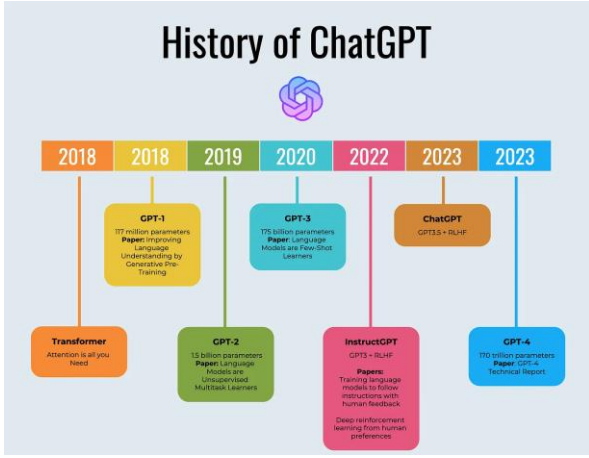

Fig 2 : History of chatgpt

In recent months, the social impact of Artificial Intelligence (AI) has been at the forefront of public debate due primarily to the introduction of new software systems and technologies, specifically ChatGPT. Generative models offer a vast array of practical possibilities, including in the fields of engineering, journalism, programming, public administration, teaching, and scientific research. However, concerns regarding potential adverse effects present an opposing viewpoint, with arguments spanning from privacy risks to deepening social inequalities. While the former raises ethical concerns, the latter worries about the societal impact of generative models with mass accessibility and usage

1.2. Research Objectives

This research as a whole is a response to the wider debate about the social impact of generative AI.

It aims to contribute to deliberations on how generative AI models and applications can be designed and used in a manner that avoids possible adverse social consequences and ensures community engagement is enhanced. These deliberations have to take into account varying social contexts and realities across which the generative AI models are deployed.

Inspired by a Rapid Action Lab conducted in early 2023 with seven public actors from five different European countries, as well as a literature review, various scalable generative AI models that can enhance proactive community engagement will be presented. In addition to proposing concrete models, parallel attention will be given to the risks, challenges, and limitations that generative AI technology presents. The importance of being aware of these obstacles and/or thoroughly considering them when designing generative AI applications is

underlined. Furthermore, attention is drawn to the necessity of ongoing dialogue between community actors and technology developers in ensuring the socially responsible application of generative AI.

Equation 1: Education Impact

$$I_{\text{education}}(t) = \sum_{i=1}^{k} (w_i \cdot Ed_i(t))$$

- $I_{\text{education}}(t)$: Education impact of AI at time t.
- $Ed_i(t)$: Effect of i-th education intervention at time t.
- w_i: Weight of each education intervention.
- k: Number of education interventions.

This research aims to highlight the role that generative AI can play in strengthening community engagement with a specific focus on social responsibility. On one hand, the research intends to clarify the practical usage of generative AI for community organizations, local authorities, and other public actors engaged in community work. On the other hand, it aims to indicate the possible risks and challenges associated with this technology and how these can be mitigated. The involvement of social scientists and the community itself in the design and implementation of employed generative AI technologies is emphasized throughout.

2. Understanding Generative AI

Within the context of artificial intelligence, generative AI refers to a set of powerful technological tools capable of producing original content, including text, images, audio, or computer code.

Generative AI operates through complex machine learning models that are trained on extensive datasets curated from human-source content. These models recognize patterns within the training data, which enables them to create new material that aligns with the observed patterns. Recently, the emergence of the internet's "AI arms race" has propelled generative AI to the forefront of public attention. Concerns about the potential threats posed by artificial intelligence, particularly generative models, to humanity, society, and the social sciences have gained increasing visibility. On the other hand, AI research refers to the social scientific study of artificial intelligence. Although still in its infancy, social scientists have the potential to play a crucial role in shaping the future development of generative technology. Generative AI has become the most discussed technology globally over the past year since the emergence of publicly available chatbots. Considerable public attention has been devoted to their risks and challenges, particularly regarding the spread of misinformation, bias, and harmful content. Social scientists must engage with generative AI since these tools will inevitably influence the public's social realities either way. It is possible to imagine instances where social scientists might collaborate with AI developers to minimize the potentially harmful societal impacts of these technologies.

2.1. Definition and Concepts

Technological innovations have thus far primarily supported organizations in reacting to community needs after crises, disruptions, or disasters. This research uses generative AI to support proactive engagement, working to alleviate challenges community-focused nonprofits experience in developing social responsibility programming. Community engagement can often feel like a "one-step-forward, two-steps-back" process plagued by underdeveloped programming. Nonprofits want to engage communities in co-creating social responsibility initiatives yet struggle to find the right opportunities and entry points to do so. Challenges include decision-makers lack of lived experience with community needs, uncertainty in framing community-focused programming, apprehension in approaching communities, and fear that communities will not respond or be interested in engaging.Generative AI refers to computer algorithms that can create new content in a variety of formats, including text, images, music, and videos. That includes products such as ChatGPT text generator and its DALL-E image generator. Generative AI technology has spread rapidly, drawing both fascination and scrutiny from the public and lawmakers. Generative artificial intelligence (AI) has the potential to innovate community engagement, catalyzing scalable models through public, private, and nonprofit partnerships.

2.2. Applications in Various Fields

However, techno-optimistic narratives about generative AI as an opportunity should be critically assessed. For example, how exactly can generative AI foster proactive community engagement? What kind of generative AI applications in community engagement processes should be developed? And how can these applications be developed in a way that ensures community engagement practitioners choose the most relevant generative AI-driven tools for their needs? These questions are particularly pertinent given that societal actors' current frames and understandings of generative AI are often narrow, underspecified, and occasionally based on misconceptions or overhyped expectations of what generative AI can achieve.To answer the above questions, an analytical framework of five generative AI application models for community engagement is developed. The framework can help researchers and practitioners identify, generate, and prioritize community engagement needs that can be fulfilled by generative AI applications.

Four characteristics of the generative AI application models are also proposed. These address issues of accessibility, co-design processes, public scrutiny, and openly shared technologies that are essential to avoid generative AI applications exacerbating social inequalities or designing "quick fixes" for community engagement challenges.With the emergence and rapid diffusion of Large Language Models (LLMs), such as ChatGPT, Google Bard, Llama-2, and Claude, many societal actors view generative AI as an opportunity.

They hope that this new digital technology can create a fruitful path toward socio-ecological transformation in the age of the Anthropocene. Community engagement practitioners and researchers also increasingly espouse generative AI as a technology that can strengthen community engagement processes and make them more fruitful, fair, and inclusive. This is relevant because community engagement fosters public education and participation in decision-making processes on social responsibility issues. These include climate change adaptation, ensuring local food systems, and strengthening diversity and inclusion policies in

urban development.

LLMs and chatbots by company

Company	LLM	Chatbot
OpenAI	GPT-3.5, GPT-4	ChatGPT
Google	PaLM 2	Bard
Anthropic	Claude 2	Claude
Meta	Llama 2	N/A (accessed via Hugging Face)

Fig 3 : LLMs and Chatbots by company

3. Proactive Community Engagement

Proactive Community Engagement is a new research initiative to leverage generative AI in aggregating community inputs and proactively reaching out to communities. With rapid technological innovations, communities continue to confront various challenges despite having a social responsibility framework and policies in place for technology deployment. This is primarily attributed to the challenges in ensuring the scalability of community engagement efforts and then making these efforts proactive, where communities are engaged ahead of technology deployment instead of being reactive where communities are engaged post-deployment to address concerns.

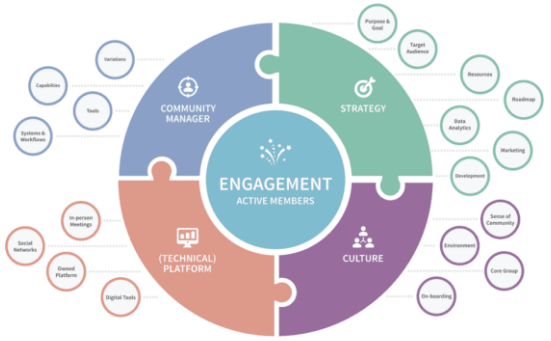

Fig 4 : The Community Circle Model

Generative AI can play a crucial role in aggregating community inputs and proactively reaching out to communities. Two technological innovations are being developed under this research initiative. The first is a scalable model to aggregate community inputs using generative AI. The paradigm of focus is large language model service provision, where community engagement social responsibility policies and frameworks are used to fine-tune large foundation language models to create a model that can serve community input aggregation. The second is a proactive community engagement model using generative AI that

can generate outreach plans for communities based on aggregated community inputs. The paradigm of focus is large language model service provision, where community engagement outreach plan templates specific to the technology's contextual deployment are used to fine-tune large foundation language models to create a model that can serve outreach plan generation for community engagement efforts.

3.1. Importance and Benefits

Generative artificial intelligence (AI) tools, such as ChatGPT and Dall-E, have gained significant traction and recognition across societies, influencing how individuals interact with their surroundings and one another. Beyond their personal or commercial applications, generative AI tools can profoundly impact community and civic engagement, shaping how communities formulate their priorities, systematically and methodically capture collective viewpoints, and proactively convey them to relevant public authorities and stakeholders. Despite these technological advancements, the community/user perspective has generally been overlooked in the discourse surrounding generative AI's societal effects and impacts. While discussions have emerged around the applications of generative AI and related tools in social rights, social good, fairness, and justice, there is still limited understanding of how communities might proactively harness generative AI to enhance collective community capacity and agency in matters affecting their social well-being.

Equation 2: Social Well-being Index

$$W_t = W_0 + \int_0^T I_{\mathrm{AI}}(t)\, dt$$

- W_t: Social well-being index at time t.
- W_0: Initial social well-being index.
- $I_{\mathrm{AI}}(t)$: Impact of AI on social well-being at time t.
- T: Total time period of AI intervention.

This inquiry aims to stimulate deliberation, discussion, and knowledge co-creation among researchers, practitioners, and public authorities regarding the potential community/user applications of generative AI in enhancing community/community group engagement, with a particular focus on public authorities at varying levels. It seeks to explore the opportunities, challenges, and considerations in co-developing and piloting such community/application perspectives generative AI tools and services. To facilitate this exploration, current knowledge and reflections on generative AI tools and applications will be shared, along with illustrative examples from prior development and experimentation efforts. These efforts have primarily concentrated on community group engagement in influencing the planning and development of generative AI systems, technologies, and services.

3.2. Challenges and Limitations

Generative AI extends beyond keywords to deliver value-added services to existing target audiences and prospects. Generative AI models can synthesize text, images, video, and/or audio with minimal human guidance. Most implementations concentrate on written content, including text-to-image, image-to-text, text-to-text, or other content combinations. Text-based

ChatGPT is the most prominent illustration of generative AI and one of the quickest-growing platforms in history. Generative AI services can take several forms, including distinct brands or services, embedded capabilities in existing platforms, or back-end services for others to use. ChatGPT is an example of a standalone branded service. The Google Search generative experience (GSGE) represents generative AI embedded in a well-established service. Similarly, ChatGPT powers integrations with a variety of firms and services. Proponents enthusiastically endorse the promise of generative AI, potential applications, and use cases across industry verticals. The generative AI market is predicted to expand rapidly, rising from $11 billion in 2023 to $110 billion in 2023.

On the other hand, there is considerable debate about the threats and limitations of generative AI. For example, concerns about how generative AI may affect social stability, security, and inequalities are topics of intense discussion across various sectors. ChatGPT and other generative AI technologies may replicate and aggravate discrimination, prejudice, and marginalization against socially vulnerable groups. Generative AI contributes to the rising proliferation of misinformation, information manipulation, and "deepfakes." Wider social worries such as unemployment, payment inequality, and skill gaps could also arise from generative AI-induced labor market shifts. For example, over 200 business and tech leaders signed an open letter advising a six-month halt on AI development to further study the perils of AI. Generative AI technologies' social influence has become a vital subject of scrutiny and concern. Such scrutiny and concern examine desirable and undesirable social results generated by or involving generative AI. Nevertheless, understanding and knowledge of generative AI's social influence is still nascent

4. Developing Scalable Models

To address the challenges faced by non-profit organizations (NPOs) in developing effective proactive community engagement models, there is a need for generative artificial intelligence (GAI)-based scalable model templates. These templates can augment community managers with recommendations on engagement intervention design, target community segments, analysis of past interventions, and the generation of intervention content. The proposed approach aims to enhance community engagement model accessibility by community managers, ensuring efficient community resource utilization. The model template development process consists of four phases: (i) community engagement challenge characterization, (ii) GAI model opportunity identification, (iii) GAI model implementation and evaluation, and (iv) GAI model template documentation. The proposed approach is examined through a use case involving a community addressing youth suicide prevention. This use case highlights the benefits and limitations of a generative AI model implementation, focusing on collaboration and the need for oversight when utilizing generative AI models in proactive community engagement. The proposed approach applies to various community engagement challenges, enabling the co-creation of GAI model templates with domain experts in different context communities.

4.1. Methodologies and Techniques

Exploring the Social Impact of Technology and Activism proposed by the potential of

generative artificial intelligence (AI) technologies—large language models (LLMs) that can produce text and other content—needs to be unpacked with care. Like other newly emergent formats, technologies, and platforms, generative AI can both deepen inequities and support social progress. Generative AI assumes multiple roles and genres—but consideration should be taken not to overstate its capabilities and impacts. Generative AI can assist new forms of observational analysis, research activism, journalism and advocacy, art and storytelling (including participatory forms), and public engagement with research. Generative AI technologies can also redefine social context and contract in ways that inadvertently erase the power and agency of social actors, including academic and policy researchers, instead attributing outcomes solely to the tools, technologies, and datasets themselves. Generative AI can also foreground immediacy and simplicity, rendering some modes of engagement ephemeral, replaceable, or one-dimensional. Research engagements, and the social worlds they model, need to be developed in detail, with consideration given to the form, genre, and media of outputs. Generative AI can create compelling narratives but cannot replace the need for deliberation that interrogates context, method, and possible multiple readings. The Impact of Technology on Society Technologies, including research technologies and outputs, are neither deterministically good nor bad. Rather, their impacts are uneven, emergent, and often contested. Generative AI models are trained on existing textual resources published widely, which already embody social power and inequality. Consequently, generative AI can replicate this bias. Generative AI can also augment research, community, and political engagement or co-option by more powerful interests (including scientists, policymakers, corporations, and social movements). Generative AI systems can produce text, analysis, visuals, and video that mimic academic and news reporting styles, including large publicly funded research projects, activism campaigns, and social movement narratives.

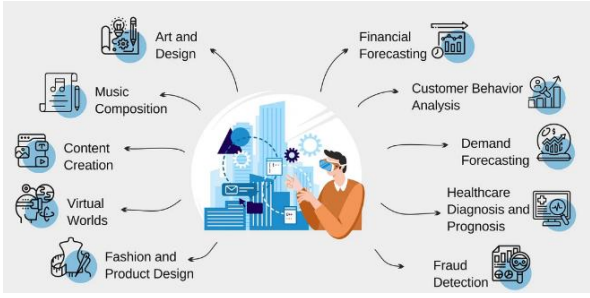

Fig 5 : Generative AI Applications

4.2. Case Studies

Engaging local communities in the co-design and co-creation of Artificial Intelligence (AI) Systems can help create long-lasting social impact and empower residents to take action on vital issues affecting their lives. To achieve this objective, it is important to understand the community's needs, cultures, strengths, and assets before designing AI systems. AI systems that impact local communities must be designed and developed with their collaboration from the outset. Otherwise, pre-developed solutions may fail to address local issues of interest and concern. In addition, the co-design process should allow local communities to actively participate in the design of AI systems, contributing their experiences, perspectives, and knowledge. They should also be involved in the implementation process, including collecting

data and interpreting results. This helps avoid situations where people feel they have been subjected to experiments or research without their consent. Empowering local communities is vital to co-designing AI systems to create awareness and encourage action on issues that affect their lives. The collaboration of scientists and local communities in co-designing AI systems for supporting local communities towards awareness of astrobiology in a science outreach context is presented. The challenges faced in this endeavor focused on creating long-lasting impact locally, co-designing AI systems with local communities, and leveraging community strengths, assets, and needs. In awareness of Climate Change and Astrobiology, scientists from various disciplines aimed at empowering local communities through the co-design of AI systems.

5. Enhancing Social Responsibility through Technological Innovations

Generative AI depicts social responsibility as the responsibility of proactively adjusting social behaviors conforming to social contexts. Social responsibility is artistically innovated through generative technologies that create the grounds for communities to iteratively explore and rethink social responsibility together. Proactively engaging communities in deliberative manners is vital to exploring social responsibility and the appropriateness of generative AI technology. Community engagement is publicly and proactively discussed and engaged in deliberative manners through art installations set up in different community contexts. For technology design, the art of engagement is community sensitivity. Community contexts play a key role in shaping how engagements are artistically designed, and community art engagements explore as much as possible the appropriateness of technology in the contexts. Generative AI and technological innovations are expected to art responsibility and proactively explore social responsibility; however, it is equally important to examine the appropriateness of generative AI technology and community engagements through art in different community contexts and careful re-exploration of technology in communities.Generative AI fuels technological innovations for artistically enhancing social responsibility and offering community engagement. Still, the art of innovation does not simply mean adopting technology. It is concerned with artistic exploration and re-exploration of technology with communities to rethink social responsibility together. Community engagement is challenging, and the responsibility of building an engaged community often relies on a few active community members. Community engagements inevitably fade away without continuous efforts.

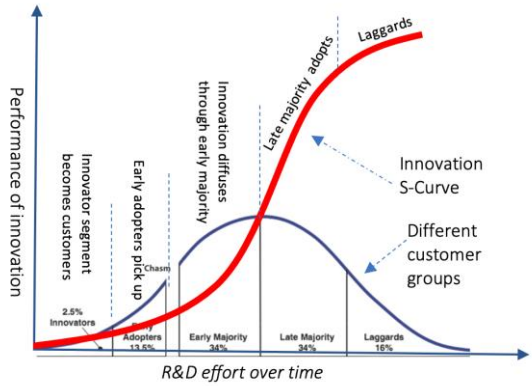

Fig 6 : Innovation S-curve

Proactive community engagement aims to create scalable models that help communities smoothly engage without relying solely on a few proactive members. Generative AI assists community members in co-evolving engagement proposals in a deliberative manner. Community members collaboratively assess the pros and cons of engagement proposals generated by AI. Scalable models and generative AI are illustrated through an ongoing art research project creating generative art for proactively engaging the research project's community.

5.1. Current Trends and Innovations

Concerns regarding potential adverse effects present an opposing viewpoint, with arguments spanning from privacy risks to deepening social inequalities. Models like ChatGPT personalize the digital version of the Delphic oracle, where people expect to find answers to their current problems. Social scientists increasingly warn against the myth of neutrality surrounding technological advancements. Generative software models are created in specific social contexts and, therefore, are likely to reproduce existing social inequalities and injustices. Hypothetically, these models could be neutral from a technical perspective, but their operational environments, including data sets, design choices, and end-user applications, are far from neutral. These contextual factors shape the cooperation between technology and the social world, with possible positive and negative outcomes. As with previous technologies, mounting concerns arise regarding the potential societal drawbacks of generative models despite their perceived advantages. It is essential to question whether, in this race, it is possible to genuinely resolve uncertainties or only uncover new ones regarding the scope, boundaries, and prospects of generative models' societal impact.In recent months, the social impact of Artificial Intelligence (AI) has been at the forefront of public debate due primarily to the introduction of new software systems and technologies, specifically ChatGPT. The rapid development of these technologies has sparked the debate regarding the advantages, limitations, and risks of Artificial Intelligence's expanding capabilities. New generative software models that create text, images, audio, and computer code have taken the world by storm. Tech giants are joining the race in generative AI development, and several start-ups are attempting to design similar systems. Fund managers are betting on the success of these technologies, pouring billions of dollars into generative AI start-ups and companies. While the

enthusiasm surrounding generative AI is justified, it is crucial to reflect on and analyze its potential social impacts. From healthcare to cybersecurity, generative models offer a vast array of practical and prosperous future possibilities. This debate will weigh the pros and cons of generative systems, highlighting the most crucial and urgent risks and social concerns regarding their deployment, as well as possible solutions.

5.2. Ethical Considerations

Generative AI technologies can enhance community engagement processes by assisting with content generation, analysis, and language translation to promote inclusivity and accessibility. Developing scalable models can help organizations identify and address local community challenges, expectations, and values. However, the application of generative AI in community engagement processes requires consideration of potential risks and unintended consequences. While these technologies can help address social challenges, they can also inadvertently reinforce existing inequalities, biases, and discrimination if not implemented mindfully.

Equation 3 : Transparency- Explainability of AI Decisions

$$H(X) = -\sum_{i=1}^{n} P(x_i) \log P(x_i)$$

Where:

- $P(x_i)$ is the probability of a particular outcome, and
- $H(X)$ is the entropy of the system.

Accordingly, five ethical principles have been drafted to support the responsible use of generative AI applications in community engagement: 1) ensuring human agency and oversight, 2) fostering inclusive and equitable community engagement, 3) preventing bias, discrimination, and misinformation, 4) promoting transparency and accountability, and 5) prioritizing privacy and data protection.

Generative AI technologies, such as text-based LLMs, have emerged as increasingly capable and accessible tools for organizations, researchers, and practitioners seeking to promote proactive community engagement through social responsibility initiatives. To realize the potential of generative AI models in proactively engaging communities, organizations must consider several technical and ethical factors that can impact design choices and implementation decisions. While there is a growing interest among organizations in understanding the social impact of generative AI technologies and their community engagement applications, researchers can help organizations address knowledge gaps by collaborating on practical case studies that unpack their context-specific opportunities, challenges, and implications.

6. Conclusion

General professional technology engagement should be conducted, examining Generative AI's role strengths, limitations, and risks while interrogating and co-defining proactive social responsibility technology adoption strategies. For widely accessible technologies, focus

community engagement efforts on co-developing tailored adjustments for public institution use. On technology risks conducive to community vulnerability, design actions should advance a broad engagement coalition across community segments, targeting knowledge co-production regarding technology and mediation model relevance and transparency inquiries.

Despite concerns regarding potential adverse effects, the significant impact, both positive and negative, of Generative AI on society currently necessitates devoted consideration.

To stay socially responsible and coherent with the proactive engagement paradigm proposed, applied research should focus on community engagement with Generative AI. Specifically, communities impacted by its social advances, involving scholars and practitioners dealing with social issues, should be engaged. Reversely co-developed, scalable models for pro-social applications of Generative AI, akin to widely accessible technologies, should be pursued. Research exploration through concrete cases could involve communities currently addressing relevant social issues, such as disinformation in local elections, the digital divide in public health communication, youth vulnerability to social media exploitation, or hate speech challenges.

6.1. Future Directions

With the rapid recent advances in Generative AI capabilities, social scientists are encouraged to consider how the potential utility of these tools might be harnessed for research and engagement. Over the last several months, attention has turned to the ways in which Generative AI might augment or disrupt the science and practice of community engagement. Technological innovations offer an opportunity to enhance social responsibility models within community engagement and service-learning across educational institutions. Proactive community engagement through the integration of Generative AI innovations would benefit a wider range of communities by enabling scalable models beyond research-intensive geography. The intent is to catalyze further discussion and exploratory research addressing the opportunities and challenges that Generative AI presents for community engagement and co-design within the social responsibility agenda. Addressing this gap would therefore not only further academic discussion but generate insights of direct relevance to professional practice across various community engagement settings, including universities, Local Authorities, community and arts organizations, and health services. Pilot experiments using Generative AI technologies to enhance social responsibility community engagement models across educational and public community planning activism have been undertaken. Observations and initial findings from this exploratory research will be outlined, in addition to opportunities for future collaborative research.

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