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Gender Equality and Inclusive Technology: Cultural Innovations for Sustainable Development in Khyber Pakhtunkhwa (KP), Pakistan

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Abstract

Gender equality remains a formidable challenge on a global scale, and leveraging inclusive technology offers a promising alternative for addressing the issue. This paper explores the untapped nuances of gender equality and inclusive technology within the framework of Sustainable Development Goals (SDGs) as a roadmap for success. Qualitative research methodology was utilized; a sample of ten educated women and men was purposively selected for in-depth interviews. The findings identify the barriers to gender equality in relation to accessible technology, suggests policy solutions for promoting inclusion, and explicates the significance of policies in building resilience through achieving SDGs. Gender Equality and Social Inclusion (GESI), is used as the main policy framework for the analysis of the prevalent inequities linked with gender and technology for sustainable development. The data concludes the need for collaborative partnerships to localize global programs through community-driven praxis. Furthermore, prioritizing gender equality through inclusive technology in sustainable development efforts and programming facilitates accessibility for women.

Keywords: Gender Equality & Social Inclusion (GESI); Inclusive Technology; International Development; Policy Programming; Innovation; Khyber Pakhtunkhwa (KP)

Introduction

Gender equality remains a significant global challenge, with disparities persisting across various socio-cultural and economic contexts. Leveraging inclusive technology presents a promising opportunity to address these disparities, particularly within the framework of Sustainable Development Goals (SDGs) (Fund, 2015). The SDGs represent an ambitious and complex development agenda, requiring substantial political will and efficient policy implementation to achieve resilience and sustainability in an interconnected world. This paper argues for the importance of inclusion in the context of Khyber Pakhtunkhwa, (KP), examining how gender and technology serve as socio-cultural and economic enablers, respectively. Using relevant secondary resources, the paper maps the

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progress of SDGs in a rapidly transforming technology-driven world, justifying the niche for inclusive development practices that are in compliance with the SDGs' mantra of *Leave No One Behind* (*LNOB)* (Fund, 2015). It is crucial to incorporate local insights from the global South in order to create a more inclusive and interactive approach to development praxis shaped by diverse realities.

Inclusive technology, therefore, must be understood in terms of creating a more just, creative, and collaborative world that includes everyone. This warrants a lens of intersectionality to initiate uneasy conversations riven with challenges about (in)forming inclusive spaces—a nuanced experience for inclusive development and resilience. Such inquiries involve exploring larger systems, such as local traditions, values, and assumptions, which are encoded in and reinforced through the design of sociotechnical systems (Siddiqi & Collins, 2017). Technology's comprehensive scope includes numerous sectors, including healthcare, education, and employment, posing critical concerns about whether technology *drives* or is in itself, *driven* by the principle of justice. Thus, *Design Justice* is a methodology and practice driven project that vies for removing endemic structural disparities in sociotechnical systems. It calls for probing and transforming design values, practices, narratives, sites, and pedagogies to debias these systems (Costanza-Chock, 2020). Sustainability cannot be attained if data justice remains uninformed of inclusion as a standard benchmark for the 17 goals and 169 targets of SDGs. It is imperative for policy-based initiatives to guarantee fair access to technology, develop women's digital literacy, and encourage their participation in the digital economy. Moreover, the digital revolution and widespread use of mobile phones play a crucial role in reducing development inequities and endorsing sustainable development for marginalized communities.

Gender equality is inseparable from human rights for achieving SDGs. This paper taps into the intersection of gender and inclusion, focusing on *SDG 5b* that ties in inclusion to digital transformation. Field data identifies the presence of structural, political, and representational barriers that reinforce inequality; suggestions for tackling them through effective programming for fair solutions. By examining the use of technology for empowerment via inclusive policies, the study seeks to introduce local resilience and empowerment, especially for women in the gender-segregated cultural settings of KP. Technology provides a platform for education, skills, and employment, allowing women to gain empowerment while remaining within their homes. If utilized in accordance with cultural rubrics, technology can nurture resilience by involving local stakeholders without causing cultural conflicts. Therefore, addressing the gender gap in technology and innovation systems necessitates destigmatizing and empowering women to attain resilience inspired by the transformative 2030 development agenda.

Review of the Literature:

The Intersection of Gender Equality and Inclusive Technology

The nexus of gender equality and inclusive technology is central to the context of SDGs. The goals emphasize the principle of "*Leave No One Behind" (LNOB)*, mandating inclusive approaches to development (Fund, 2015). In contexts such as Khyber Pakhtunkhwa (KP), Pakistan, the complex socio-cultural and economic frameworks require nuanced strategies to utilize technology effectively in promoting gender equality and scaling up sustained development initiatives. Despite global tech progress, substantial digital divides prevail, particularly in gender and socio-economic domains in the global South. Digital divides are not necessarily technology-based, however, are manifestations of deep-seated normative expectations that jeopardize women's accessibility. (Goldey et al., 1997). Women, oftentimes, remain excluded due to low-impact digital knowledge, scarce financial resources, and restrictions on mobility, exacerbating the gender inequities (Hafkin & Huyer, 2006). However, in KP, the roadblocks are aggravated by conventional gender expectations that reduces women's input and mobility in public spaces (Naz, 2018). This situation calls for targeted metrics to track technological access and socio-cultural influences driven by indigenous insights for avoiding unintended consequences.

Policy Solutions

Inclusion practices are facilitated by incorporating the technological and socio-cultural dimensions for meaningful policy conversations. *Design Justice*, a framework proposed by Costanza-Chock (2020), endorses an inclusive design practice that initiates discussions for understanding the needs and experiences of marginalized communities. It supports equitable access by discouraging the use of technology that facilitates the juggernaut of inequities and unjust systems. In KP, inclusive technology policies should deliver on providing culturally-responsive digital literacy programs; access to digital tools, internet connectivity; promoting women's participation in technology-driven academics and industry-based opportunities.

Furthermore, it is essential for digital literacy programs to be culturally-situated, by supporting policy solutions that respect the local gender expectations and participation in the decision-making process to have the sense of ownership and responsibility to deliver solutions. (Fayomi et al., 2021). However, injustice in any form requires reimaging the structures. Inclusive technology cultivates resilience towards realizing Sustainable Development Goals (SDGs) by delivering access to services and opportunities for the underserved. Siddiqi and Collins (2017) theorize that socio-technical systems—digital infrastructures, act as an accelerator for socio-economic progress and well-being. Women's access to technology has positive outcomes in building resilient systems of education, healthcare, employment such as

distance-learning programs, telemedicine and remote flex jobs as opportunities in the gig economy.

The Role of Data and Intersectionality in Inclusive Development

The meaningful impact of technology on gender equality can only be achieved through gender-disaggregated data since its non-availability leads to gender gaps in policy programming (World Bank, 2019). Moreover, it facilitates access and usage of technology by formulating targeted policies. Furthermore, applying an intersectional lens to inclusive development is significant for undoing the crosscutting social categorizations such as gender, race, and socio-economic status, which produce complex systems of disadvantage (Crenshaw, 1989). In the context of KP, this involves addressing the multi-dimensional inequalities experienced by women and marginalized groups due to cultural inequalities and policy gaps that contribute to the inaccessible use of technology.

Global perspectives on technology and gender equality provide substantial insights, however, when translated to local contexts, it ensures social inclusion and justice. For instance, the international development sector's prioritization for investing in marginalized communities and incorporation of distributional impact into policy design enable inclusive growth (OECD, 2017). Such values can lead the development of inclusive technology policies in KP as gender-responsive and culturally-situated praxis by leveraging local perspectives. Abbasi (2021), considers the sole reliance on economic growth driven by global North's ideology and systems as a caveat, which has oftentimes made inclusive development ineffective in Pakistan. Instead, a more nuanced approach of engaging local communities, understanding their needs, constraints, and co-developing solutions that are community-driven and contextually relevant works best for advancing SDGs in KP, Pakistan. Policymakers can propose equitable technology solutions by utilizing global insights, local realities, and implementing frameworks like *Design Justice* and intersectionality. In the digital age, such frameworks are critical for building an equitable, inclusive, and resilient future by ensuring that women and marginalized groups are not left behind. Thus, an analysis of how gender data gaps strengthen unjust systems, unravels the prevalent male-default standpoint in design and policy, that excludes women's experiences and needs. Nevertheless, addressing gender-disaggregated data gaps in baseline researches is significant to ensure inclusive and equitable solutions in the technological and socio-political contexts (Perez, 2019).

Gender Equality and Social Inclusion (GESI)

The approach of Gender Equality and Social Inclusion (GESI) has evolved from broader discussions on inclusive development and social justice within the international development programming to facilitate implementation fidelity. It integrates gender equality concerns with broader social inclusion issues to create

more comprehensive and equitable development outcomes. Gender parity involves addressing the power imbalances between men and women in various domains of life, while social inclusion integrates marginalized groups into mainstream society (Rao and Kelleher, 2005). The GESI framework is essential for identifying and undoing systemic barriers that maintain exclusion. The GESI's "Theory of Change" (World Vision, 2020, p.5) facilitates a shared understanding of the necessary changes for gender equality and social inclusion and their systematic applicability in numerous programming phases and tools.

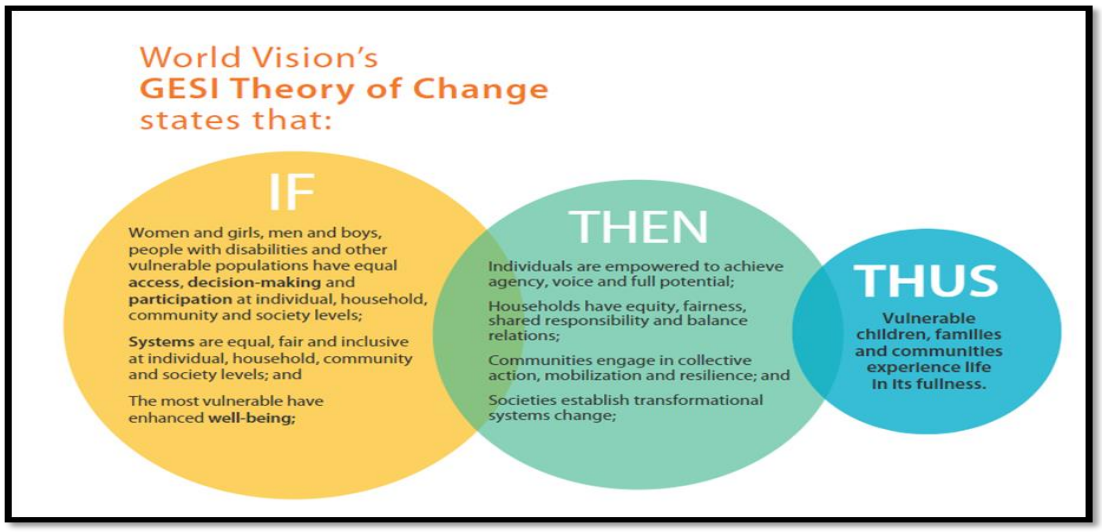


Figure 1: Theory of Change by World Vision (2020, p.5)

Gender Inequality in Khyber Pakhtunkhwa (KP), Pakistan

Traditional Pakhtun culture is known for rigid gender norms that restrict women's mobility, educational opportunities, and economic empowerment (Kabeer, 2005). KP has some of the lowest statistics for female literacy and labor force participation in Pakistan. It is difficult to attain gender equality because of these social norms, which prevents creating opportunities for women (PBS, 2020). Another research highlights that women in KP experience multiple levels of marginalization due to overlapping positionalities such as socioeconomic status, ethnicity, and displacement as an aftermath of war and securitization (Mumtaz & Salway, 2009). Technology promotes gender equality since it provides avenues for women to access knowledge, education, and economic possibilities. Digitalization, therefore, can improve the agency and participation of women and marginalized groups in societal processes by having better opportunities that give freedom from poverty through enhancing capabilities (Heeks and Renken, 2018; Sen, 1999).

Likewise, cellular phones and internet facilities improve access to online education, healthcare information, and digital financial services. This has particular relevance in regions like KP, where infrastructural and cultural barriers often restrict women's access to conventional forms of education and employment that are not virtual. Therefore, tech devices' usability/accessibility such as ownership of cell phones among women in low- and middle-income countries (LMICs) is associated with increased economic participation and improved access to health information (Donner et al., 2011). Moreover, cellular phones can reduce the inaccessibility of information about markets, enabling women entrepreneurs to reach broader markets and expand their economic independence (Jensen, 2007). These findings note that technology can play a significant role in addressing gender disparities in KP, however, the cultural trade-offs can be made successful by community-driven approaches.

Despite the potential benefits, the adoption of technology in KP, replete with challenges is a concern. Sociocultural resistance and infrastructural gaps are major roadblocks to women's use of technology. Wyche and Olson (2018) argue that technology is not inherently neutral; it can reinforce existing inequalities if designed and used without implementing social inclusion as an epistemology. It is crucial to ensure that digital tools and platforms are accessible, affordable, including gender-sensitive content and designs, no language barriers, and are user-friendly for everyone (Khan et al., 2019). Nevertheless, in KP, inclusive technology suggests potential resource to mitigate women's mobility by providing remote access to education and employment opportunities that aligns with the cultural expectations of women's mobility. (Hafkin & Huyer, 2006).

Data Gaps and Evidence

The effective implementation of GESI principle, in KP, will improve data tools to support sustainable development. Gender-disaggregated data for determining indicators of social inclusion in KP is contributing to gender gaps in policy statistics (PBS,2020). Buvinic at.al. (2014), reinstates the significance of rigorous data gathering and analysis for understanding the need-specific challenges, designing tailored interventions, and tracking progress of different groups. Data-driven insights ties into technology-related policies for addressing gender equalities, informing development practitioners in creating contextually relevant and impactful solutions. Hence, gender-disaggregated data is needed for tracking development targets (Morrison et al., 2007). GESI approach, therefore, is critical for identification of prevalence data needed for policy gaps and becomes instrumental to shape inclusive and equitable solutions.

Global commitments for gender equality, particularly their alignment with the SDGs can be attained by leveraging inclusive technology. For instance, SDG 5 explicitly aims to achieve gender equality and invests in all women and girls, while other goals, such as SDG 4 (quality education), SDG 8 (decent work and economic growth), and

SDG 10 (reduced inequalities), are intrinsically linked to GESI objectives (UNDP, 2015). By creating synergies between technology, GESI, and the SDGs, development initiatives in KP can facilitate inclusive and sustainable progress. Thus, GESI principles with SDGs, becomes a key to unlock effectiveness of development programming by breaking down the organizational silos (Kabeer (2016).

International Programming Strategies

International research funding, in collaboration with local governments, can launch processes for training women in digital skills. United Nations (UN) bodies, especially UN Women (2019), and UN Development Program, can assist in scaling up programs that promote gender equality and inclusive technology (UNDP, 2020). Moreover, different initiatives such as World Bank's 'Digital Economy for Africa' program focus on including gender perspectives into digital policies and investments, for equal benefits from technological advancements for the underserved groups (World Bank, 2018). Locally, successful case studies from regions with similar sociocultural contexts, such as the 'Digital Bangladesh' is a success story for promoting digital literacy and economic participation among women through gender-focused training and public-private partnerships (Aminuzzaman, 2019). These initiatives leverage collaborative approaches, combining international support, local government action, and community engagement to create an inclusive technoscape. Such comprehensive strategies are crucial for addressing the complex barriers women face in accessing and utilizing technology. Stakeholders can develop and *install* technological solutions that entail inclusive development and address gender disparities in KP by generating data-driven insights in consistency with the global development agenda.

The literature review depicts the significance of inclusive technology in addressing gender inequality and poverty. However, gender-differential access to technology, socio-cultural norms, and economic constraints etc., derails the sustainable development trajectories of social justice.

Research Methodology

Qualitative research method was used to explore the experiences of 10 respondents with the age range of 25-55 years. The sample consisted of an equal distribution of five males and five female participants, selected purposefully to capture a diverse range of experiences of technology and gender inclusivity in the region. Respondents were taken from different urban and rural regions of KP residing in Peshawar. The research method involved semi-structured interviews conducted via digital platforms, allowing for in-depth exploration of each respondent's views. The interviews generated themes such as access to technology, barriers faced by women, societal attitudes towards technology use, and perceptions of gender roles. Sampling was conducted using a combination of purposive and snowball sampling techniques (Creswell, 2013). Initially, respondents were selected based on their expertise in

community development in both government and non-profit sectors, academia, or support for gender equality in digitalization. Remaining participants, however, were identified through referrals from initial interviewees to have a diverse representation across KP, residing in Peshawar but belonging to different geographic locations/districts.

Data Findings and Discussion

The data findings and analytical insights indicate the substantial gains of inclusive technology in promoting gender equality within the context of SDGs. Upon consolidating the data findings from a diverse group of participants in KP, Pakistan, numerous important themes emerged, explicating the intersection and importance of technology, gender inclusivity, and cultural dynamics in the region.

Technology about Gender and Social Inclusion (GESI)

The respondents emphasized the crucial role of technology in evolving gender and social inclusion, while acknowledging the presence of significant cultural barriers. The first respondent, a social activist, recognized the prospects of technology-use to promote inclusivity but also pointed out the cultural norms that deter women's access. A government representative shared similar concerns about unequal access due to societal norms and insufficient digital education for women. On the other hand, the third respondent from a non-profit organization preferred the increasing adoption of technology among women, mentioning initiatives that improve digital literacy and cultural shifts towards greater gender equality. Nevertheless, all respondents unanimously stressed the critical role of technology in advancing Gender and Social Inclusion (GESI). Technology, thus, has the potential to bridge gaps in education, healthcare, and economic opportunities for marginalized groups, particularly women (World Vision, 2020). One of the respondents, a student commented:

"I am not aware of gendered accessibility as I only Approach it as a skill learning"

This response is reflective of lack of understanding of gendered use of technology. Such findings invariably highlight cultural constraints. In KP, cultural norms often restrict women to domestic spaces, limiting their ability to benefit from technology and hence has unequal gendered implications. The respondents, consistently highlighted that irrespective of technology's competence to empower women through remote work and online education, these opportunities remain inaccessible due to societal restrictions on women's mobility and digital literacy. The cultural constraints that limit such factors reflect engrained gender norms. Such barriers require technological solutions in tandem with cultural shifts that challenge the prevailing norms. Community-driven programs, therefore, are pivotal for bringing a gradual

attitudinal shift by demonstrating the pros of women's participation in the digital economy for both men and women.

Likewise, ensuring digital literacy, is facilitated by GESI strategies that includes digital literacy programs tailored for women. This informs pedagogy of basic digital skills by resolving cultural concerns that prevent women from technology's access and use. Digital literacy programs need to expand beyond technical training; including components that empower women, build confidence, and provide them with the social support needed to (re)negotiate their roles within their families and communities. This inclusive approach shapes digital literacy programs as more sustainable. Policy interventions, such as promoting GESI must be context-sensitive, culturally-relevant for KP. Moreover, advocating for community-based digital literacy initiatives and support from local leaders facilitates women's participation in technology. Policy programs should be designed by consulting communities to strive for greater community outreach. Engaging important tools, such as local leaders and stakeholders in the policy-making process amplifies the relevance and acceptance of these policies. Policies need to be flexible enough to adapt to changing circumstances and community-generated feedback to realize localization of international standards as ongoing collaborative processes.

Who Designs the Development Agenda and for Whom?

The respondents concurred on offering inclusive development agendas by asserting gender equality. The respondents emphasized policies and programs designed to empower women economically through technology. One of our female respondents highlighted personal benefits from online education and professional opportunities, indicating progress but acknowledging ongoing challenges. Another respondent in agreement, noted improved resources and support systems enabling women to leverage technology for economic empowerment.

Respondents shared that the development programs are often designed without adequately consulting the intended beneficiaries, particularly women. Inclusive development agendas must involve women from the global South in the design and decision-making processes to ensure that the policies and programs reflect their actual needs and challenges. This can be facilitated through establishing women's advisory groups, think-tanks, and community meetings that ensure women's voices are heard. Implementing participatory approaches in policy design leads to more effective and sustainable outcomes. Participatory approaches not only improve the relevance of development programs but also empower the participants. When women are involved in designing the programs that affect their lives, they are more likely to feel a sense of ownership and commitment, enhancing the sustainability of these programs. This fits with the "five domains of change" including participation and accessibility within GESI (World Vision, 2020, p.6). The existing power dynamics exclude women from decision-making spaces. Policies need to address power imbalances by ensuring

women's representation in leadership roles within development agencies and government bodies. Addressing power dynamics requires intentional efforts to create and maintain spaces where women can exercise leadership, such as quotas for women in leadership positions, capacity-building programs to prepare women for these roles, and supportive networks that enable women to succeed and advocate for their communities meaningfully (Hadi, 2017).

Another important finding from the field-data jotted the missing link between pedagogies and narratives. An inclusive technological system can only challenge dominant narratives that propagate gender stereotypes by transforming existing narratives and pedagogies. Inclusive pedagogies in Science, Technology, Engineering, & Mathematics, (STEM) education has the potential to leverage women and other marginalized groups' participation in the digital economy and endorse technological innovation (UNICEF, 2020; Bebbington, 2020).

Gender-Differential Accessibility

The concerns of the respondents about gender-differential accessibility towards technology were unanimously identified. Technology, in itself appears neutral, but its accessibility and usability is gendered, particularly in KP. However, such gaps can be bridged by collaborating with civil society-led workshops, government initiatives, and international support from agencies for digital literacy of women. One of the respondents considered economic barriers as a significant factor since women in KP often face lower income levels with no financial independence; restricts their ability to purchase devices and access to the internet. These economic disparities require solutions that address root problems such as lack of education and employment opportunities for women. Microfinance programs, income-generating activities, and social protection schemes can help women gain the financial independence needed to access technology (World Bank, 2019).

Another respondent highlighted educational barrier that exacerbate differential accessibility. Lower levels of education among women reduce their digital literacy and confidence in using technology. Bridging the gender gap in education is essential for improving digital literacy among women. Educational programs require to be designed as accessible and appealing to women and girls, considering their specific needs and challenges (World Vision, 2020). Such as, flexible learning schedules, safe transportation to schools, and curricula that are relevant to their life-choices and aspirations. In rural areas of KP, inadequate infrastructure includes unreliable electricity and lower internet connectivity affecting women disproportionately, who are less likely to travel to urban centers for access (Amir 2017). Accessible technology for women can be attained through improving rural infrastructure. This includes physical infrastructure—electricity and internet connectivity, digital infrastructure such as affordable devices and user-friendly platforms.

Data-Driven Insights

The lack of gender-disaggregated data is a foremost barrier for effective policies and programs design. Targeted interventions require data for identifying gaps and evaluating outcomes of the programs. Therefore, gender-disaggregated data collection processes presuppose investment in technology and human resources (Heeks & Renken, 2018). Data-driven policy formulation should be iterative and responsive. One of the female respondents from the academia shared her insights on gender gap in data:

> "*Building gender-disaggregated data systems demand investments in both technology and human resources. Providing training for local researchers, using mobile and online data tools, and protecting data privacy are important for having such systems. Having no real data makes policies remain unsuccessful in addressing the different problems that women face."*

Policymakers must be equipped to modify their strategies according to the locally-generated responses and new data. Such iterative approaches assure sustainable policies. Continuous research and evaluations are necessary to track the effectiveness of policies. Gender-disaggregated data accommodates assessment of the influence on women and create innovative solutions. Built-in evaluation mechanisms into the design of policies and programs from the outset regularize monitoring and evaluation. Combined with transparent reporting and community response-mechanisms, these mechanisms enable policies and programs to achieve their intended outcomes and resilience for strengthening women's lives (World Vision, 2020).

Sociotechnical vs. Sociocultural

The sociotechnical and sociocultural interface influences the success of technology in stimulating gender equality. Sociotechnical system contains the technical infrastructure and digital platforms that facilitate access to technology (Siddiqi & Collins, 2017). Collaboration between technologists, sociologists, and community leaders facilitates designing culturally-sensitive sociotechnical systems. Such a transdisciplinary approach suggests that technology solutions need to be technically sound, culturally appropriate, and acceptable. One of the male respondents commented:

> *"Societal norms and practices shape women's use of technology therefore we need to actively engage with communities and understand their cultural preferences.*"

In contrast, sociocultural factors, cater to the societal norms, values, and practices that shape women's interaction with technology. Community engagement and cultural

sensitivity are fundamental to resolving sociocultural barriers, according to the respondents. Community dialogues, participatory workshops, and awareness sessions help create an inclusive space where women feel supported and encouraged to use technology. Inclusivity and usability of technology in alignment with cultural practices, can be improved by combining the sociocultural and sociotechnical approaches for promoting development that is locally trusted. According to a respondent from academia, digital platform designs ought to respect cultural practices by providing content in local languages and formats that are accessible to women with low literacy levels to bridge the gap between technology and social inclusion.

Synergy with other SDGs

The respondents endorsed the potential of leveraging the synergy across different SDGs to strengthen resilient economic development. Education (SDG 4) with technology improves educational outcomes for women, offering greater economic opportunities. Digital education platforms enable access to quality education, particularly in remote areas. Utilization of technology to improve educational outcomes requires a multidimensional approach. This includes providing affordable and accessible digital devices, developing high-quality online educational content, and training educators to effectively use technology in their teaching. One of the female respondents, a gender researcher/scholar, commented:

> *"Using technology in education can empower women by enhancing learning opportunities, especially in remote areas."*

Economic Growth (SDG 8), promotes women's participation in the digital economy and inclusive growth. This includes supporting women entrepreneurs and providing access to digital marketplaces. Supporting women's participation in the digital economy enables an environment that includes access to capital, mentorship, and business development services. Digital platforms that connect women entrepreneurs with markets and customers can scale up their businesses and increase their income. Reduced inequalities (SDG 10), bridge the gender digital divide for addressing the inequalities. It necessitates a comprehensive approach that identify the symptoms and root causes of the gender digital divide. This includes targeted interventions to provide technology access and skills training to women, broader efforts to change societal attitudes, and norms that perpetuate gender inequality. One of the respondents from the academia shared:

> *"Despite progress, women in KP continue to experience inequality, especially in the rural area in accessing and benefiting from technology, and hence an ongoing need for interventions to bridge the gender digital divide."*

Partnerships building (SDG 17) between governments, private sector, and civil society is crucial for implementing the GESI strategies. Collaboration can break down the silos in global and local development negotiations and expertise to address complex challenges. A respondent from the government sector asserted:

> *"Government, private sector and civil society partnerships facilitate implementation of policies and efficient use of resources and expertise."*

Government policies that incentivize private sector involvement in GESI initiatives, combined with civil society's grassroots knowledge and outreach, can create powerful synergies. Multi-stakeholder forums that facilitate dialogue and collaboration monitor the efforts to ensure that initiatives are complementary rather than duplicative.

The data findings and discussion from the interviews provide critical insights into the intersection of gender, technology, and social inclusion in KP, Pakistan. The themes discussed the complex nature of the challenges and the need for extensive, context-sensitive theory-of-change to promote gender equality through inclusive technology. Such policy conversations require upfront combination of community engagement, and robust data-driven strategies to ensure that no one is left behind in realizing sustainable development.

Analytical Significance for International Development Policies and Programming

The intersection between gender equality and inclusive technology influences analytical implications for international development policies and programming. Policymakers and development practitioners can understand, design, and implement equitable strategies through an intersectional lens. Awareness of the socio-cultural and economic contexts of regions like KP allows for the development of culturally tailored interventions. Policies, that consider local realities, such as gender norms and cultural practices, are resource-efficient and sustainable. This leverages research praxis and strategic coordination between institutions, policymakers, and local communities. Abbasi (2021) emphasizes the importance of culturally situated solutions that consider the community-driven needs and constraints of local contexts.

Gender and socio-economic status require targeted policies to provide equitable access to technology for questioning prevalent digital divides. Affordability, accessibility, and international development programs bridge such gaps by innovating digital literacy initiatives. Thus, the need for interventions that address both technological and socio-cultural barriers to access is imperative for sustainable outcomes (Goldey et al, 1997). Inclusive technology policies, accustomed to international development, particularly SDGs such as SDG 5 on gender equality and SDG 9 on industry, innovation, and infrastructure offer synergistic solutions. Such contributions accelerate inclusive access to

technology, international development, and expected goals of economic growth, education, and healthcare, and reduce inequalities (Fund, 2015).

Nevertheless, an intersectional lens to inclusive development identifies the overlapping components of social categorizations such as gender, race, and socio-economic status. The intersectional approach ensures that policies address the multidimensional inequities experienced by women, suggesting all-inclusive solutions (Crenshaw, 1989). Framing global perspectives and local insights into gender equality and technology reassures better data-driven policies and practices. Investing in marginalized communities and incorporating distributional considerations into policy designs are highly contested by international development agencies (OECD, 2017). These principles as "best-shared practices" can guide the development of inclusive technology policies in diverse contexts like KP (Fund, 2015).

Conclusion

The theoretical framework of GESI leverages international development by promoting gender inequities and shared prosperity. This study contributes to broader discussions on inclusive development in coordination with the SDGs by unpacking the conversations between sociotechnical systems, policy frameworks, and cultural norms. Thus, it is inevitable for policymakers, development practitioners, and stakeholders in KP to prioritize gender-responsive programming in technology design and implementation as a way forward. This entails designing an enabling environment that empowers women economically and socially through equitable access to digital resources, educational opportunities, and entrepreneurial support. Irrespective of challenges, there are actionable pathways identified by this study for leveraging inclusive technology as a catalyst for gender equality and sustainable development in KP. Integration of these insights into policy programming, stakeholders can contribute to building resilient communities as envisioned by the SDGs.

Policy solutions and implementation addressing the gender divide in technology requires coordinated efforts from research-praxis, government initiatives, and civil society engagement. Effective policy designs, and practices can ensure gains for SDGs, however, the caveat, is to be aware of local context-driven information and grassroots system for understanding inclusion and resilience. Interestingly, technology can both enable/disable gender equality subject to better policy practices/ tools in the context of KP, Pakistan. There is, however, a greater need for effective policy designs for sustainable outcomes and gender equality (specifically, SDG-target no. 5b on inclusive technology) in diverse contexts. A major limitation of the paper, is its preliminary insights which needs deeper policy-informed evaluations and analysis of gender equality and inclusive development. Nonetheless, it provides primary insights to inform data justice in policy designs for international development practitioners, government, and academia towards formulating inclusive and sustainable programming strategies.

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