AI-Based Digital Transformation and Social Capital in Civic Engagement among Pakistani University Students

Arslan Asghar[1], Aqsa Atta[2] & Muhammad Ahsan[3]

Author's Affiliation:

[1]PhD Researcher/Doctoral student, Department of Political and Social Sciences, University of Salerno, Italy.

[2]Lecturer, Department of Sociology, Thal University Bhakkar, Pakistan.

[3] M.Phil. Scholar, Department of Sociology, BZU Multan, Pakistan.

Corresponding author(s):

Arslan Asghar
Email:
aasghar@unisa.it
Co-author(s) Email:
Aqsa Atta
aqsaatta511@gmail.com
Muhammad Ahsan
m.ahsandrishak00@gmail.com

Abstract

Purpose— In an increasingly digitalized society, understanding how technology intersects with social behaviors is essential for sociological inquiry. This study explores the influence of digital transformation, social media exposure, and institutional trust on civic engagement among university students, with digital social capital examined as a mediating variable.

Study Design/methodology/approach— Grounded in sociological theory, this research targets the student population of the University of the Punjab, Lahore, one of Pakistan's largest public universities. Using a quantitative design, data were collected through an online survey distributed to a purposive sample of 450 undergraduate and postgraduate students. Analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Findings— The results reveal that all three independent variables have significant positive relationships with civic engagement, and digital social capital plays a significant mediating role, amplifying the effect of digital and institutional variables on students' civic behavior.

Research Practical Implications— This research contributes to the intersection of digital sociology and youth civic participation, offering insights for academic institutions and policymakers aiming to foster active citizenship in digital context.

Originality/value— It uniquely examines digital social capital as a mediator linking digital transformation, social media exposure, and institutional trust to students' civic engagement in a Pakistani university context. It also provides PLS-SEM–based evidence from one of the country's largest public universities, offering context-specific insights that are scarce in the youth civic engagement literature.

Keywords: Digital Transformation, Social Media Exposure, Institutional Trust, Digital Social Capital, Civic Engagement

1 | INTRODUCTION

The rapid spread of digital technologies has reorganized the channels through which members of society strike a balance between their social, political, and institutional environments in modern societies. In rapidly digitalizing societies, traditional offline spaces of civic engagement, like voting, participating in a public meeting, or campaigning with a political party, are no longer the only spaces of civic engagement. The digital space has instead become a powerful configurative domain of civic expression, advocacy and collective action (Sonker, 2021). This reconfiguration is especially salient in the youth, whose engagement in digital ecosystems allows them to be instantaneous, decentralized, and very accessible. In Pakistan, with the youth population comprising a significant percentage of the overall population, a subtle understanding of digital civic participation is a must in the context of academic research as well as policymaking. The University of the Punjab, one of the largest and most well-known higher education establishments in the country, provides a suitable background against which the issue of how digital technologies influence the sense of agency, social responsibility, and institutional trust among young citizens could be explored (Zhanbayev et al., 2023).

The increased availability of the internet, the prevalence of smartphones, and the increased adoption of digital tools in educational institutions have made digital transformation a core aspect and not an outlying characteristic of student life. However, despite the fact that digitalization provides extensive possibilities to expand civic engagement, it also creates the issues related to digital inequality, echo chambers, and misinformation (McCarthy et al., 2023). The social media serve as a means of entertainment and communication as well as a platform of civic mobilization and sociopolitical awareness.

At the same time, trust that people have in formal institutions, government bodies, educational institutions, and media, still mediates their perceptions and reactions to civic matters in digital spaces. Collectively, these conditions form a sociotechnical ecosystem where digital social capital has emerged as a central mediating construct: it refers to the network-based resources, relationships, and trust that have been built through digital interactions and shape the ability of participants to engage in meaningful ways with civic issues (McCarthy et al., 2023). The dynamic interaction between the digital transformation, exposure to social media, institutional trust, and digital social capital therefore provides a holistic analytic frame through which the way young people negotiate their way in civic life in the context of digitally mediated environments can be explored.

Digital transformation is the process of integrating digital technologies into various areas of everyday life to transform communication, access to information, service delivery, and interaction. In the case of university students, digital transformation includes their capacity to use digital tools to study, socialize, and engage in civic life, representing not only their digital literacy but also their willingness to work in a more and more virtualized environment. The given phenomenon is not limited to the availability of technologies; it is also dependent on digital fluency and adaptability. Social media exposure refers to the level at which people interact with and consume information through Facebook, Twitter, Instagram, and WhatsApp (Olaitan, 2021). Such platforms, in the case of university students, serve not only as the platforms of individual expression and entertainment but also as the means of receiving news, discussing social problems, and organizing joint actions. Institutional trust is the level of confidence that people are able to hold about the working as well as the integrity of institutions that organize social life. Institutional trust determines how people perceive online civic engagement as legitimate, effective and worthwhile in digitally mediated civic spaces (Kożuch & Sienkiewicz-Małyjurek, 2024).

Civic engagement is a conceptualization of active involvement of people in actions that

promote the common good, such as political communication, community, activism, and online advocacy. Nowadays, civic activity has both off- and online dimensions; the latter has become more prominent with the availability of digital affordances. Digital social capital is a point of connection between the digital and the civic: it is the relational resources and trust created by digital interactions and can either promote or prevent civic action (Cockburn & Cockburn-Wootten, 2022). It has the norms, networks and trust developed by the interaction on the Internet, thus affecting informational resources, emotional support and collective efficacy. The stronger and more stable the digital networks students build and maintain, the more likely they will see civic content, discuss it, and become involved in civic action, enhancing the impact of digital transformation, exposure to social media, and institutional trust on their civic behavior (E. Finkel et al., 2024).

The theoretical framework that the study is based on combines the theory of social capital developed by Pierre Bourdieu and its adaptation to the digital environment and complements it with the theory of planned behavior. Bourdieu described social capital as the sum of the available or potential resources that are associated with a stable network of relationships; in the digital world, social capital is restructured, which leads to the emergence of the concept of digital social capital. This construct represents the trust, norms and networks that are built as a result of digital engagement that may enable or limit civic engagement (McCarthy et al., 2023). The theory of planned behavior also argues that the behavioral intentions are determined by the attitudes, subjective norms and perceived behavioral control. Attitudes and norms are informed by digital transformation and exposure to social media, and perceptions of efficacy and control are informed by institutional trust and digital social capital. Digital social capital is thus warranted as the mediating process that transforms digital exposure and trust into civic action through facilitating meaningful interactions and knowledge exchange in the online environments (Caputo et al., 2023).

The academic literature has focused on several aspects of civic engagement, but little research has explored the intersection of digital transformation, exposure to social media, and institutional trust in influencing civic behaviour in developing economies and higher education in particular. Much of the previous studies have occurred in Western settings, which have stable digital infrastructures and high levels of institutional trust. As a result, the results of these studies might not be valid in environments like Pakistan, where digital divides are severe, institutions are distrustful, and sociopolitical instability is high (Ashraf et al., 2025). Moreover, despite the fact that previous literature has recognized the importance of digital social capital in determining the online participation, its mediating effect between digital and institutional variables and civic engagement is poorly understood. Such a gap is especially relevant to the youth population, the identities of which, political awareness, and social activism are closely linked to digital life. The need to comprehend these dynamics is enhanced by the fact that governments and institutions are increasingly using digital platforms to communicate to the masses, educate the citizens, and distribute their policies (Milenkova & Lendzhova, 2021).

The relationship between digital technologies and civic engagement in Pakistan needs to be examined critically at this stage, where digital access is growing exponentially but unevenly. The COVID-19 pandemic accelerated the use of digital instruments in the education sector and the sphere of public discussion, revealing opportunities and gaps. Whereas a few students used the digital platforms to engage in civic advocacy and awareness campaigns, others were not able to do so because of infrastructural or skills constraints (Wang & Si, 2024). At the same time, political instability, issues of governance, and unpredictable policies have undermined institutional confidence, thus influencing the willingness of the youth to engage in civic issues. In such circumstances, digital social capital becomes the critical variable of the extent to which students

will interact with civic matters, whether they feel empowered to do so, and whether they perceive the civic institutions are responsive and legitimate. This paper aims to shed light on the processes by which digital and institutional forces are converted into active civic engagement among university students by looking at the mediating effect of digital social capital (Gu & Huang, 2022).

Thus, the research problem deals with the role of digital transformation, exposure to social media, and the trust of institutions in the context of civic engagement in Pakistan and, in particular, how digital social capital mediates these relationships among students at the university. The solution to this issue is crucial to the development of research in digital sociology and political science and to the development of practical approaches to improving youth participation in democratic and community-related processes. To promote civic responsibility among the future generation, universities and policymakers will first need to understand the sociotechnical environment that influences civic behaviour within digital environments (Singh, 2024). The acknowledgement of digital social capital as a vehicle of civic engagement can contribute to the creation of inclusive, participatory, and digitally literate learning conditions that enable students as change agents.

The given study has relevance to various stakeholders. The findings can be used to guide curriculum development, extracurricular activities, and digital literacy initiatives to promote active citizenship in the case of academic institutions. The insights can inform policymakers on how to develop youth engagement policies that can take advantage of the use of digital spaces to enhance democratic engagement and civic awareness. To the scholars, the study generalizes existing theories of social capital and civic participation into the digital mediated spheres in the Global South, filling a gap in the literature that has persistently existed. The study also addresses a demographic that is both politically relevant and digitally literate but underrepresented in empirical civic studies by studying university students in Pakistan. It is aware of the heterogeneity of youth cohorts and the multidimensional consequences of digitalization, media exposure, and trust processes on civic life. Finally, the research is relevant to the further development of knowledge on the use of digital spaces in the creation of socially integrated, informed, and engaged communities in transitional democracies.

With the world still struggling to find the solutions to the consequences of digital transformation, the need to develop civic engagement in terms of equitable, inclusive, and trust-based digital networks has grown to unprecedented levels. This paper attempts to answer that urgency by decoding the complex interplay between technology, trust, and civic behaviour in the context of a developing nation. It will contribute to the understanding of the directions to enhance civic life in the digital era and make young people active agents of democratic and social processes through theoretically informed and empirically rigorous inquiry.

2 | LITERATURE REVIEW

This study is based on the theoretical development of social capital and its use in the context of the digital world. Classical social theorists conceptualized social capital as an asset that is made up of trust, normative bonds and resilient networks that facilitate collective action and civic engagement. An early definition of social capital by Bourdieu saw it as the reserve of resources one has access to via long term social relationships, whereas later sociological thought has emphasized its role in terms of community cohesion and democratic participation. These conventional notions have been expanded with the emergence of online relationships and interactions that are enabled by the digital technologies. Digital social capital is thus a term that refers to how users utilize their online networks to gain access to information, build trust and join civic life (Pang, 2023). This level of sophistication is compatible with the sociotechnical systems theory that argues that human

behavior and institutional practice is the product of the interplay between social structures and technological affordances. The theory of planned behavior also helps to understand the role of attitudes, social norms, and perceived behavior control, which are the elements that are systematically formed by digital transformation, exposure to media, and trust, in determining whether people will have the desire to engage in civic action. In the digital spaces, the attitudes that the participants have towards civic engagement depend on what they see and read, the trust that they have on institutions, and the encouragement that they get in the online communities. The theoretical connection emphasizes the role of digital social capital as both the result of online engagement and a factor that leads to civic engagement (Ferrucci et al., 2020).

The evidence is also becoming empirical to support the notion that digital transformation is contributing to the improvement of civic engagement especially among the younger generation. In the context of education, digital transformation does not only involve the introduction of new technologies but also the involvement of digital practices in the learning, communication, and engagement processes. Those students who are well-educated in terms of digital tools and platforms have more abilities to access civic information, participate in online campaigns, and interact with the institutions of the state. Studies carried out in technologically progressive settings show that digital transformation has the potential to increase democratic awareness, political efficacy, and participation through the diminution of access barriers and the improvement of connectivity (Rwigema, 2020). The effects of digital transformation are more diverse, though, in developing country contexts. Despite the growth in internet penetration and mobile technology use, which has created more opportunities to engage with, there is still the presence of infrastructure gaps, low levels of digital literacy, and economic disparities that still characterize the ability of young people to participate in civic life through the digital medium. However, in the case of the effective integration of digital tools into the educational and social institution, they have the potential to make students more aware of the civic issues, provide them with platforms to discuss the topics, and engage in collective action (Skaržauskienė & Mačiulienė, 2020).

One of the most obvious avenues in which youths access civic and political contents is the social media exposure. Social media like Facebook, Twitter, Instagram, and WhatsApp are virtual public spheres where the discourse, advocacy, and mobilization are conducted. Empirical research proves that exposure to social media may influence civic attitudes, support political learning, and encourage participation. These media can facilitate the spread of information quickly, decentralize the organization of civic activism, and give voice to the marginalized. To university students, especially those who are located in politically active spaces, social media is a central platform of identity construction and civic engagement (Guo & Chen, 2022). Nevertheless, the impact of social media remains unstable; on the one hand, it can be used to increase the level of engagement, but, on the other hand, it can lead to misinformation, political polarization, and performative activism. To this end, the quality, frequency and context of social media exposure are significant in ascertaining the net effect of social media on civic engagement. Interactive character of social media promotes the development of digital communities where people share ideas, discuss problems, and develop solidarity, which are the essential elements of digital social capital (Shin et al., 2022).

Institutional trust is another important consideration in defining civic engagement. Confidence in government, media, the judiciary, and educational institutions determines the readiness of people to engage in civic and political activities. The willingness of the people to make voluntary contributions to common objectives is when institutions are seen to be legitimate, transparent, and responsive. Institutional mistrust on the other hand may lead to apathy, disengagement or resistance. Trust also shapes the way people process information, react to the

messages that are publicly delivered, and interact online within a digitally mediated environment. Trust among young people in educational institutions, civic agencies, and digital platforms affects the sense of efficacy and responsibility (Mothafar et al., 2024). Trust is further salient in situations where there is institutional instability as in the case of Pakistan. Digital civic activities often depend on the belief among youth that their voices count, and that the government will listen to them and act on their interests. Thus institutional trust does not only precondition offline civic participation but it also determines the acceptability of digital channels of civic participation. An increased level of institutional trust will drive people to consider online platforms as valid sources of civic engagement (Matveieva et al., 2022).

Digital social capital is an important mediating factor between digital transformation, exposure to media, and institutional trust and civic engagement. It is described as the resources that are embedded in digital networks that can be activated to do collective and civic action. This is achieved by creating such resources through long-term online communication, involvement in digital communities, and the belief in peer networks and information sources. In this way, digital social capital allows people to get information, support by peers, emotional reinforcement, and mobilization opportunities. As a person gets involved into these networks, they receive more perceived behavioral control, which is part of a system of civic norms and behaviors (Igwe et al., 2020). In addition, digital social capital assists in mediating between institutional frameworks and individual behaviors through a sense of belonging and collective efficacy. Empirical studies indicate that the greater the digital social capitalization of individuals, the higher the chances of participation in political discourse, online signing of petitions as well as donation to civic causes. In the academic setting, learners living in active online communities are more aware, proactive, and engaged citizens. Digital social capital mediates the digital exposure and institutional trust, and turns passive digital consumption into active civic behavior (Feng & Tan, 2024).

Although there is growing awareness of such interrelations, there are still major gaps in the literature, especially about the developing world and young people. Most studies on digital transformation and civic engagement have been done in high-income environments where digital infrastructure and institutional trust is comparatively stable. On the other hand, in environments such as Pakistan, digital divides, unequal institutional credibility, and lack of civic space are the characteristics, which determine how digital transformation and media exposure can be translated into civic action. Whereas digital social capital has been theorized as a predictor of civic engagement, its mediating effect has not been well studied, particularly with regard to institutional trust and technological adoption (Shin et al., 2022). The relationship between trust in institutions and online social dynamics is context-specific and complicated and requires further empirical exploration. Moreover, university students, who are very active in the digital sphere and politically aware, are also underrepresented in civic studies. This population group is particularly significant to research because they are the future of democratic engagement and follow the digital trends rapidly. By filling these gaps, more insight will be gained into the sociotechnical processes that influence the civic behavior of the youth in transitional democracies (Asimakopoulos et al., 2025).

The current research based on theoretical and empirical synthesis suggests a model where digital transformation, social media exposure, and institutional trust have a positive effect on the civic engagement of university students. Digital social capital is considered to mediate these relations, hence increasing their impact on civic behavior. The following hypotheses can be used to explain these relationships: (1) Digital transformation will have a positive impact on civic engagement because students who have access to the digital tools and skills will have more access to information, communicate efficiently, and take part in civic life; (2) Social media exposure will

have a positive impact on civic engagement because interactive media environments enable students to participate in discourse, advocacy, and mobilization; (3) Institutional trust will have a positive influence on civic engagement because students who trust institutional actors and platforms will perceive participation as meaningful and effective; (4) Digital transformation will have All these hypotheses together encompass the multidimensional channels that the digital and institutional variables influence the youth in terms of participation in civic life.

3 | METHODOLOGY & DESIGN

The current study had a quantitative design to examine the connections between digital transformation, social-media exposure, institutional trust, digital social capital, and civic engagement among undergraduate and postgraduate students at the University of the Punjab, Lahore (henceforth UOPL), one of the largest and most heterogeneous public universities in Pakistan. The decision to adopt a quantitative approach was driven by the desire to answer theoretically based hypothesis through the use of systematic measures and empirical statistical processes. Informed by the philosophical paradigm of positivism (the view that reality is definite and measurable), the study was carried out under the belief that the phenomena that were being studied are interrogable through observable variables. In this context, the researcher used standardized data-collection instruments and drew generalizable patterns on a sub-sample and a larger population.

Based on theoretical and methodological contemplations, the researchers worked with the assumption that the university students are an ideal population to study digital civic engagement. Being digitally engaged, socio-politically conscious members of the society, they provide valuable insights into modern trends of engagement. Moreover, being the future leaders and decision-makers, their experiences and opinions shed light on the current transformation of the civic engagement. In order to capture this heterogeneity, the sample was composed of people with different academic backgrounds to ensure that varying experiences of digital use and civic engagement could be included.

The data were gathered through an online survey questionnaire that divided the perceptions and behaviours of respondents into five constructs, namely digital transformation, social-media exposure, institutional trust, digital social capital, and civic engagement. Both constructs were based on validated scales in the existing body of literature and adapted to the Pakistani higher-education context. Each item was measured using a five-point Likert scale with the range of answers between strongly disagree and strongly agree. A pilot study of 30 students was done before the full deployment to determine reliability and clarity and resulted in minor adjustments to facilitate a better understanding.

After the collection of data, all the responses were checked in terms of accuracy and completeness. The analysis was done using Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4.0 software package. It was considered that PLS-SEM was especially appropriate in predictive modeling and the involvement of complex, interrelated latent constructs. The analysis has been done in two consecutive steps. To start with, the measurement model was evaluated in terms of reliability and validity, including indicator reliability, internal consistency, convergent validity, and discriminant validity. In step two, the structural model was tested to assess direct, indirect (mediated), and total effects between variables; bootstrapping 5,000 resamples was used to establish the significance of path coefficients and increase the strength of the results.

The project was strictly ethical. The survey was voluntary, and the informed consent was collected. The aim of the study, the assurance of confidentiality, and the right to withdraw anytime were clearly stated. Personally identifiable information was removed, and data were stored securely

and with restricted access. The research protocol was vetted and accepted by the institutional research ethics committee, which strengthens the compliance with academic and ethical standards and the rights and welfare of the participants, thus ensuring the credibility and integrity of the research.

4 | RESULTS AND ANALYSIS
4.1 | Reliability and Convergent Validity Analysis
Table 4.1 Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Digital Transformation (DT)	0.861	0.901	0.644
Social Media Exposure (SME)	0.842	0.889	0.616
Institutional Trust (IT)	0.874	0.914	0.680
Digital Social Capital (DSC)	0.858	0.901	0.646
Civic Engagement (CE)	0.893	0.926	0.715

The reliability and convergent validity results provided in the extant study indicate that each of the constructs meets the set standards of internal consistency and measurement accuracy. The values of Cronbach Alpha coefficients which ranged between 0.842 (in Social Media Exposure) and 0.893 (in Civic Engagement) exceeded the standard of 0.70 and thus indicated high internal reliability. The complementary composite reliability (CR) scores, within a narrow range of 0.889 to 0.926, further prove the soundness of the model because the overall reliability of the latent variables is determined. Values of average variance extracted (AVE) also surpass 0.50 in all constructs and the largest value of 0.715 is recorded in Civic Engagement and the lowest of 0.616 is recorded in Social Media Exposure, which implies that each construct explains at least 50 % of the variance in their respective indicators. Collectively, these findings indicate acceptable reliability and convergent validity levels, and thus, they guarantee that the constructs will be measured reliably and consistently to be subjected to structural analysis.

4.2 | Discriminant Validity (HTMT Ratio)
Table 4.2 Discriminant Validity

Constructs	DT	SME	IT	DSC	CE
Digital Transformation (DT)	-				
Social Media Exposure (SME)	0.621	-			
Institutional Trust (IT)	0.583	0.492	-		
Digital Social Capital (DSC)	0.635	0.594	0.611	-	

Constructs	DT	SME	IT	DSC	CE
Civic Engagement (CE)	0.601	0.572	0.588	0.649	-

The obtained values of the heterotrait-monotrait (HTMT) ratio calculated in the current research indicate strong discriminant validity of the entire model since all coefficients are below the conservative threshold of 0.85. The highest HTMT estimates were between Digital Social Capital and Civic Engagement (0.649) and the lowest was between Institutional Trust and Social Media Exposure (0.492). The highest connection was found between Digital Social Capital and Civic Engagement (0.649), a trend that is in line with the theoretical expectations since digital networks often mediate civic actions. Taken together, these results affirm that each construct measured a specific aspect of the larger digital civic engagement construct, and thus it was reasonable to include them in the structural model.

4.3| Collinearity Statistics (VIF Values)

Table 4.3 Collinearity Statistics

Construct	VIF
Digital Transformation → DSC	1.723
Social Media Exposure → DSC	1.618
Institutional Trust → DSC	1.689
DSC → Civic Engagement	1.836
DT → CE (direct path)	1.432
SME → CE (direct path)	1.519
IT → CE (direct path)	1.486

All Variance Inflation Factor (VIF) values of the constructs in the model are substantially lower than the standard-accepted value of 3.3, implying that there is no issue with multicollinearity in the current analysis. VIF is between 1.432 in the direct path between Digital Transformation and Civic Engagement to 1.836 in the path between Digital Social Capital and Civic Engagement. These findings show that no predictor is redundant or overlapping in the variance explained in the dependent variables. The low values of VIF in all paths indicate a good fit of the structural model with independent variables being adequately differentiated, which increases the reliability and stability of the estimated path coefficients. As a result, the predictive relationships in the model would be interpreted with some degree of certainty since the lack of multicollinearity would be an indication of the validity of the regression estimates.

4.4| Model Fit Indices

Table 4.4 Model Fit Summary

Model Fit Index	Value	Threshold	Result
SRMR (Standardized Root Mean Square Residual)	0.043	< 0.08	Good Fit
NFI (Normed Fit Index)	0.912	> 0.90	Acceptable

Model Fit Index	Value	Threshold	Result
RMS_theta	0.104	< 0.12	Acceptable
R² (Civic Engagement)	0.526	> 0.50	Moderate
R² (Digital Social Capital)	0.472	> 0.50	Moderate

Adequacy is evident in the structural model through an empirical analysis. The hypothesized configuration has an adequate fit as indicated by a standardized root mean square residual (SRMR) of 0.043. The result is far much below the acceptable level of 0.08 and hence a high degree of correspondence between the theoretical model and empirical data. The non-normed fit index (NFI) also confirms the goodness of the fit: it is 0.912, exceeding the minimal requirement of 0.90, and it proves to have an acceptable incremental fit relative to a null model. The RMS_theta of 0.104 also supports the strength of the reflective measurement model; it is within the acceptable limit of 0.12 showing that the outer model residuals are still within the acceptable range. Regarding the explanatory power, the R 2 values of 0.526 of civic engagement and 0.472 of digital social capital indicate rather moderate predictive accuracy: 52.6 % of variance in civic engagement, and 47.2 % of variance in digital social capital, can be explained by the predictors. All of these results confirm the explanatory power and empirical applicability of the suggested structural model in exploring the digital and institutional predictors of civic engagement.

4.5| Structural Model Results

Table 4.5 Structural Model Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Digital Social Capital -> Civic Engagement	0.10638	0.10094	0.03654	2.91145	0.01553
Digital Transformation -> Civic Engagement	0.09695	0.09169	0.03909	2.47994	0.03255
Digital Transformation -> Digital Social Capital	0.41011	0.3824	0.05528	7.41882	0.00002
Institutional Trust -> Civic Engagement	0.39754	0.40546	0.04224	9.41112	0
Institutional Trust -> Digital Social Capital	0.22454	0.24637	0.04249	5.28468	0.00036
Social Media Exposure -> Civic Engagement	0.22967	0.23938	0.04243	5.41278	0.0003
Social Media Exposure -> Digital Social Capital	0.1991	0.23005	0.01984	10.03543	0

4.6| Mediation Analysis

Table 4.6 Mediation Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Digital Transformation -> Digital Social Capital -> Civic Engagement	0.04363	0.03938	0.01818	2.40031	0.0373
Institutional Trust -> Digital Social Capital -> Civic Engagement	0.02389	0.02429	0.00738	3.23705	0.00891
Social Media Exposure -> Digital Social Capital -> Civic Engagement	0.02118	0.02342	0.00956	2.21481	0.03114

The results of a structural modelling analysis of a sample of Pakistani university students

suggest that digital transformation, institutional trust, and social media exposure all have a positive and statistically significant impact on civic engagement. The digital social capital is a crucial mechanism because it not only increases the direct civic participation but it also moderates the impact of the other variables, increasing the overall effects of the variables. The results indicate that AI-based change creates networks and relationships that inspire students to participate in civic life and that institutional trust both encourages participation and supports the reservoir of digital social capital on which it is based. Social media exposure is a direct driver of civic engagement as well as a means by which online relationships are created and maintained. In general, the mediation analysis shows that strong digital social capital significantly enhances the gains that are obtained through the use of technology, trust in institutions, and online connectivity, and as such, it creates a digitally empowered space that supports increased civic responsibility and engagement.
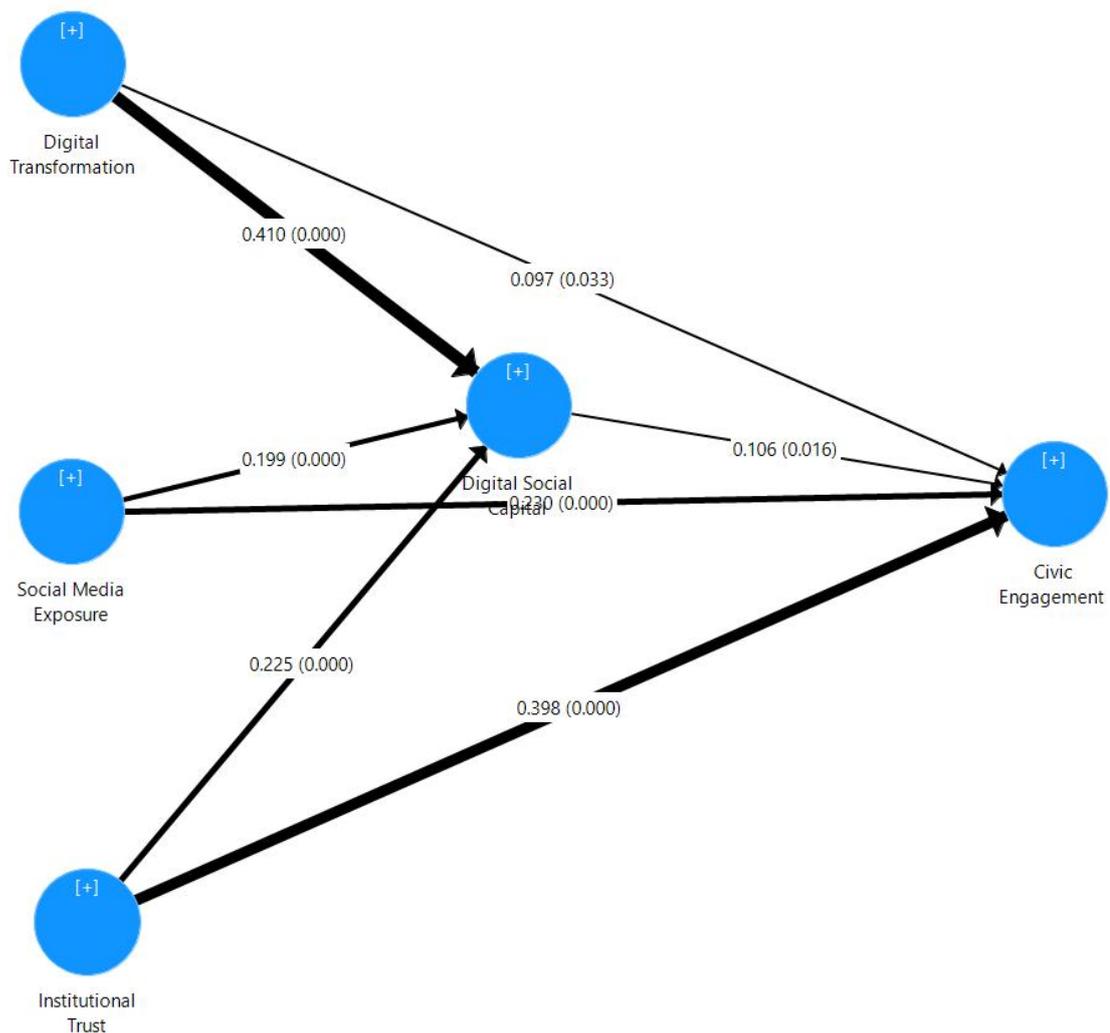

Figure 4.1: Structural Equational Model

5 | DISCUSSION

The results outlined below show the increasing role of digital transformation on civil participation in Pakistan. The positive correlation between the two variables means that technological innovation increases the scope of participation of the participants in the societal and political spheres. With the integration of digital solutions into the services and communication strategies of the public sector organisations, educational institutions and governmental agencies, citizens obtain a broadened access to information, the

increased ability to express their points of view and the increased opportunities to take collective actions. These findings support the current literature that places emphasis on the democratizing possibilities of the digital infrastructure, especially in the emerging economies.

It is also notable that the exposure to social media has a strong and good influence on civic participation. Digital technologies offer more than entertainment and communication in the hyper-connected environment of today; they represent important sites of civic learning and mobilization. The popularity of Facebook, Twitter, and Instagram allows users to get real-time information on social problems, organize community activities, and promote civic discourse. This finding is consistent with existing literature which describes social media as a two-edged tool: on the one hand, it has the capability to increase misinformation, on the other hand, it reduces the obstacles to participation by allowing instantaneous, decentralized, and broad-scale participation. Social media has emerged as a crucial medium in the Pakistan context where the traditional media are often state-controlled or geographically limited, and where the young people and the marginalized communities must express their demands and demand accountability.

The institutional trust becomes a crucial mediating factor, which supports the long-term civic participation. As long as governmental and other institutional organizations are seen as trustworthy, transparent, and responsive, people have increased propensity to engage in voting, volunteering, and deliberation in the public. This kind of confidence enhances expectations that involvement would lead to tangible results and that the institutions are acting in the interest of the people, which helps to overcome civic apathy. In the case of Pakistan, where corruption and inefficiency are still widespread, institutional trust is critical to energizing democratic practices.

Digital social capital moderates the connections between digital transformation, exposure to social media, institutional trust, and civic engagement and shows the mechanisms that underlie how these factors create civic outcomes. Digital social capital is measured as the networked resources, relationships and support systems created online and acts as a catalytic agent that enhances civic engagement. All three antecedent variables, namely digital transformation, social media exposure, and institutional trust, play an important role in building up digital social capital, which, in turn, has a significant impact on civic engagement. As a result, access to digital tools or content exposure is not the only important thing, but the quality of relationships and networks developed with the help of these channels allows individuals to engage in an authentic and sustainable way over the long term. The digital social capital is therefore a social infrastructure that enables collective action, sharing of information and long-term engagement.

These findings as a whole support the theoretical framework and prove the propositions based on the social capital theory and technology acceptance views. They show that digital technologies and media exposure are conditional on social and institutional contexts, and lead to a complex but consistent route to civic engagement in developing countries. The empirical confirmation of the hypothesised relationships has practical policy implications, providing real guidelines to the policymakers and civil society stakeholders to improve civic participation by implementing specific interventions in the area of digital literacy, institutional accountability, and community capacity building.

On the whole, the study provides compelling evidence in support of the notion that digital transformation, social media exposure and institutional trust are crucial aspects of civic engagement

promotion directly and through the moderating variable of digital social capital. The study contributes to the scarce understanding of civic behaviour in digital and institutional environments across the Global South by modelling the interaction between these variables in one analytic framework, and in a developing country setting. The results indicate that strong civic participation is dependent on an integrative approach that recognizes the interdependence between technological, institutional and social determinants.

The outcomes lead to several policy recommendations: (1) policymakers and educational institutions must invest in digital infrastructure and literacy programmes that can not only increase access to tools, but also foster responsible and informed usage; (2) policymakers must work to build trust in institutions through transparency, responsiveness, and accountability, particularly where governance failures have bred widespread cynicism; and (3) civic organisations and governmental bodies should harness social media strategically, to spread information, organise action, and build inclusive digital communities that reinforce positive civic norms. The digital social capital that is present can be utilized through civic technology platforms, online forums, and digital volunteering programs.

Theoretically, the study adds to the ongoing discussion by placing the digital and social capital aspects within the wider structural framework and by illuminating the mediator role of the digital social capital in the interpretation of complex civic behaviours. In practice, it provides practical recommendations to policymakers, non-profit organisations, and digital platforms that want to encourage more engaged citizenry in the digital age. Longitudinal processes and an investigation of moderating variables (digital literacy, socioeconomic status, political context) should be explored in the future research to give an even more detailed picture of civic engagement undergoing digital transformation.

Data Availability Statement: Data that supports the findings of this study are available on request from the corresponding author.

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