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# Transformation of Social Structure in Digital Society: Analysis of Network Sociology

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**Abstract**

*This study examines the transformation of social structures in digital society through a quantitative approach integrating social network analysis and survey data. Using a sample of 200 active social media users in major Indonesian cities, the research maps relational patterns, measures centrality, and evaluates network density and modularity to understand how digital interactions shape social cohesion, identity, and influence. Findings indicate that digital platforms facilitate the formation of new solidarities and broaden participation, yet they do not fully replace offline identities. At the same time, interaction is concentrated around key actors and shaped by platform algorithms, revealing persistent hierarchies and structural inequalities. The study highlights the ambivalent nature of digital social spaces, where connectivity coexists with fragmentation, and underscores the role of digital networks in actively constructing social meaning. These insights contribute to understanding the complex dynamics of social transformation in the digital era and provide a foundation for future research on hybrid social structures.*

## INTRODUCTION

The development of digital technology has become one of the most influential factors in shaping the face of contemporary society. The presence of the internet, social media, artificial intelligence, and network-based technologies has transformed the way humans interact, communicate, and build their social structures. While previously social interactions primarily took place through face-to-face meetings in physical spaces, communication now takes place in virtual spaces that are fluid, fast, and transcend geographical boundaries (Jordan, 2009; Larsen et al., 2006). This phenomenon marks a profound transformation in social structures, where digital networks have become the primary arena for identity formation, power distribution, and the reproduction of social values (Bozkurt & Tu, 2016; Corina, 2024; Cinque, 2024). In other words, digital society presents a new paradigm for understanding social dynamics, which can no longer be adequately explained through traditional frameworks that emphasize only static hierarchies and stratification.

This transformation can be understood through the perspective of network sociology, an approach that emphasizes the importance of patterns of relationships between

individuals and between actors in shaping social structures (Raza, 2024; Fuhse & Mützel, 2011; Shah, 2024). In digital society, networks have become the dominant structure that mediates social interactions. Social relations are not only bound by space and time, but are determined by technological architecture that enables seamless connectivity. Social media platforms, messaging apps, and online collaboration spaces form complex network structures, where individuals are no longer just members of physical communities but also part of various virtual communities that cross borders (Zhang et al., 2013; Vastardis & Yang, 2012; Chayko, 2012). This shifts the orientation of social structures from a vertical-hierarchical one to a more horizontal pattern, although in practice it still harbors hidden inequalities (Kioupkiolis, 2019).

Digitalization opens up new opportunities for the democratization of information and social participation (Alencar et al., 2024; Storozhenko et al., 2023; Llorente, 2021). Through social media, anyone can become both a producer and a consumer of information (prosumer), so that authority over knowledge production is no longer monopolized by formal institutions such as the state, mainstream media, or academic institutions (Haggart & Tusikov, 2023). Ordinary individuals can now influence public opinion, mobilize social movements, and shape grand narratives simply through digital networks. Real-world examples include various global social movements driven by social media, such as the Arab Spring, the Black Lives Matter movement, or even solidarity mobilizations on environmental issues. This phenomenon demonstrates that digital society is opening up space for the emergence of new solidarity that is not based on territory, but rather on shared issues, interests, and values disseminated through networks (Campos & da Silva, 2024; Dias et al., 2022).

However, optimism about the potential of digital democratization cannot be separated from criticism of the contradictions that surround it. The social structure in digital society is not entirely horizontal. In fact, behind the apparent openness, there is an algorithmic logic that determines the visibility, popularity, and distribution of information (Tække, 2022; Wong, 2025; Barta & Andalibi, 2024). Platform capitalism controlled by a handful of global companies such as Google, Meta, and X (Twitter) has created a new power structure based on the ownership of data and digital infrastructure. Social inequality is no longer just economic or educational disparities, but also a digital divide, namely the gap in access, digital literacy, and control over technology. This results in digital society simultaneously becoming an arena for the reproduction of inequality, where actors with greater technological and capital capital have dominant control over the direction of social network development (Verwiebe & Hagemann, 2024; Verwiebe & Hagemann, 2024; Yang & Zhang, 2023).

Furthermore, serious challenges related to identity, privacy, and social trust emerge. While in traditional social structures, identity is relatively stable because it is supported by real communities, in digital society, identity becomes fluid, fragmented, and often even manipulative (Mei, 2024; Aissani et al., 2024; Whelan, 2025). Individuals can present themselves differently in various digital spaces, creating representations that may be far from their true selves. The phenomena of fake news, echo chambers, and post-truth further complicate the dynamics of social structures, as truth is no longer determined through epistemic authority, but rather through virality and algorithms. As a result, digital social structures are often vulnerable to polarization, disinformation, and social fragmentation.

This transformation of social structures cannot be separated from the context of global political economy. The changes occurring are not only technical or cultural, but also structural in terms of power relations. In the digital era, control over data and algorithms has become a new source of domination. Individual data collected

through online activities is not simply passive information, but rather a valuable commodity that determines business strategies, politics, and even state security. Within the framework of network sociology, this indicates that social relations in digital society are not neutral but are always influenced by the distribution of power operating through technology.

Thus, digital society presents an ambivalence: on the one hand, it opens up enormous opportunities for expanded participation, the democratization of knowledge, and cross-border solidarity; on the other, it reinforces new forms of inequality, both in terms of access and control. The transformation of social structures in this context becomes an arena of struggle between openness and domination, between democratization and monopoly, between solidarity and fragmentation. A critical examination of this phenomenon is crucial for understanding the direction of digital society's development, while also anticipating potential negative impacts.

## METHODS

This study employs a quantitative research design grounded in social network analysis (SNA) in order to examine the transformation of social structures within digital society. The decision to use a quantitative approach rests on the need to systematically measure patterns of interaction, the intensity of connections, and the distribution of power across digital networks. By adopting SNA as both a conceptual and methodological framework, this study treats networks not simply as channels of communication, but as social structures that reflect broader dynamics of solidarity, hierarchy, and inequality within the digital sphere.

In this study, a descriptive quantitative methodology is taken to trace and examine the interrelations between actors who interact in the online space. The descriptive orientation is selected to obtain the complexity of the network formation, as well as offer quantifiable signs of structural change. In this model, the users on digital platforms are regarded as nodes and their interactions (likes, shares, mentions or comments) are considered as the edges between them. In this perspective, the study aims at finding structural frameworks and how much digital interaction changes the social order.

The target market group includes active social media users living in Indonesia and engaging in online discussions regarding chosen societal problems, including politics, health, or the environment. Based on this group, purposive sampling is used to identify accounts that fit a particular set of criteria, such as high interaction levels, regular engagement in digital discussion over a set period of time, and strong connection to larger online groups. A sample size of five hundred accounts is targeted to assure of a robust network visualization, as well as, statistical validity. The threshold is large enough to obtain enough density and diversity to be able to observe meaningful patterns of interaction without letting data become too fragmented.

The process of data collection will consist of two major strategies. To begin with, the paper applies the methods of data crawling and web-scraping to collect structured interaction data on the Twitter/X platform, Instagram, or YouTube in a systematic manner. There is use of specialized software: NodeXL, Gephi or Netlytic are some of the applications used to capture variables like frequency of interactions, usage of hashtags and relationship among accounts. Second, there is a complementary online survey which seeks to collect more quantitative data on the behavior of the users such as frequency of social media use, platforms used mainly, and subjective views of social transformation in the digital world. To measure the attitudes and experiences of the respondents, the survey uses Likert-scale questions that will offer a complementary layer of data to the structural one that can be investigated by the network mapping.

The network analysis is operationalized with a number of variables. The centrality measures, like the degree, betweenness and the centrality of closeness, are applied to determine how active and influential a specific actor is in the network. To measure the overall cohesion of the network, the network density is computed, and modularity is used to estimate the formation of sub-community or cluster of the network. Simultaneously, the survey provides quantifiable data of digital presence, including the level of use and perceived social impact, which are compared to the network metrics. The combination of these variables allows the study not only to evaluate the structural dimensions of the digital interaction, but also social implications.

The data analysis process proceeds in two stages. First, descriptive statistical techniques are applied to the survey results to summarize respondent characteristics and behavioral patterns. This analysis provides context for understanding the quantitative dimensions of digital participation. Second, the network data are processed through social network analysis using Gephi and UCINET. These tools enable visualization of the networks, computation of centrality measures, and identification of structural clusters. By integrating the two sources of data, the study is able to triangulate individual-level behaviors with structural-level outcomes, thus offering a more comprehensive perspective on digital social transformation.

To ensure reliability and validity, the survey instrument is tested using Cronbach's Alpha to confirm internal consistency. For the network data, validity is strengthened by conducting cross-checks between manually observed interactions and automatically collected data. In addition, results generated from different analytic tools are compared to ensure consistency in findings. These procedures provide methodological rigor and reduce potential bias in both data collection and analysis.

Finally, the study carefully observes ethical considerations in digital research. All social media data are drawn exclusively from publicly available accounts, with no intrusion into private communications. Identities of individual users are anonymized in reporting, and sensitive data are handled with confidentiality to prevent unintended harm. For the survey component, respondents are provided with clear information regarding the purpose of the study and their consent is obtained before participation. By adhering to these principles, the research maintains both academic integrity and respect for digital privacy.

## RESULTS AND DISCUSSION

This study involved 200 respondents spread across several major cities in Indonesia, providing a fairly representative picture of urban society's interaction patterns in the digital space. The respondents were 55% male and 45% female, with an age range of 18–40 years, reflecting a productive group and also the segment that most intensively utilizes digital technology in their daily lives. The majority of respondents (70%) identified themselves as active social media users with a usage duration of more than four hours per day. This figure indicates a high intensity of interaction in the digital space, while also confirming that their social lives are largely mediated by online platforms.

These findings are important because they highlight how the intensity of digital media use has the potential to shape new patterns of social relations. The high amount of time spent on social media not only reflects communication habits but also marks a shift in the locus of interaction from physical to virtual spaces. Within the framework of social structural transformation, these data confirm that digital society does not simply use technology as a tool, but rather makes it a primary arena for constructing identities, forming networks, and mobilizing social capital. Thus, the characteristics of the respondents in this study are not merely demographic

information but also a starting point for understanding how social structures in digital society are constructed and negotiated.

**Intensity of Digital Interaction**

Table 1 shows respondents' perceptions regarding the intensity of their interactions in digital spaces.

Table 1. Intensity of Digital Interaction

| Statement | Strongly Disagree | Don't agree | Neutral | Agree | Strongly agree | Mean |
|---|---|---|---|---|---|---|
| I interact more often through digital media than face to face. | 4% | 8% | 15% | 48% | 25% | 3.82 |
| My social relationships are increasingly formed through digital media. | 5% | 10% | 20% | 40% | 25% | 3.70 |
| Digital interactions make it easier for me to build social networks. | 2% | 7% | 15% | 50% | 26% | 3.91 |

The research results show that the majority of respondents (over 70%) agreed that digital interactions now dominate daily life. The average score above 3.7 reinforces this finding, as it demonstrates a consistent trend toward shifting communication and social relationship patterns. These data are not mere statistics, but rather a representation of a real transformation, where digital spaces are beginning to replace physical spaces as the primary arena for interaction.

However, it is important to note that this dominance of digital interaction cannot be viewed neutrally. On the one hand, it opens up opportunities for expanding social networks, faster access to information, and flexibility in communication across space and time. On the other hand, these findings also indicate potential disruptions to face-to-face relationships, changes in the quality of emotional closeness, and the possibility of social fragmentation due to dependence on digital media. Thus, the relatively high average score not only marks a quantitative shift but also has profound qualitative implications for the social structure of contemporary society.

**Distribution of Power and Access to Information**

The transformation of social structure is also shown in the distribution of power in accessing information.

Table 2. Access and Power in Digital Society

| Statement | Strongly Disagree | Don't agree | Neutral | Agree | Strongly agree | Mean |
|---|---|---|---|---|---|---|
| Digital media provides equal opportunities for everyone to express their opinions. | 6% | 15% | 20% | 40% | 19% | 3.51 |
| Social media algorithms create injustice in the distribution of information | 3% | 7% | 15% | 45% | 30% | 3.92 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Certain groups are more advantaged in digital society | 4% | 8% | 18% | 42% | 28% | 3.82 |

The fact data showed a high level of ambivalence in the experiences of respondents with digital spaces. On the one hand, most participants viewed digital spheres as being more participatory, as the mean value is 3.51. This statistic indicates a positive attitude towards the ability of digital media to act as a platform of democratized communication, whereby people feel that they are given the freedom to express themselves and interact without the geographic boundaries. But at the same time respondents were continuously reporting that the governance of algorithms and platforms bring inequities with a greater mean score of 3.92. These results suggest that although the digital spaces have the power to increase participation, they are limited by opaque power structures.

This confusion supports the thesis that the digital society cannot be considered to have social structures, which are entirely egalitarian. The digital realm continues to operate as a space controlled by actors of dominance, namely, technology firms and the algorithms that they create, to establish the trends of visibility, access to information, and the distribution of social capital. In such a way, the so-called digital democratization is a paradox itself: along with the openness and inclusivity that it is presented with, there are new forms of exclusion and domination. These results not only reflect the opinions of respondents but also highlight the value of the network sociology in the re-definition of the digital era social structures transformation.

**Solidarity and Digital Identity**

The aspects of solidarity and social identity are also important parts of social transformation in the digital era.

Table 3. Social Solidarity in Digital Space

| Statement | Strongly Disagree | Don't agree | Neutral | Agree | Strongly agree | Mean |
|---|---|---|---|---|---|---|
| I feel like I'm part of a certain digital community. | 5% | 12% | 18% | 40% | 25% | 3.68 |
| Digital media strengthens the sense of solidarity between individuals | 4% | 10% | 20% | 45% | 21% | 3.69 |
| My social identity is formed more in the digital space. | 6% | 14% | 18% | 42% | 20% | 3.56 |

The results of the study indicate that digital-based social solidarity is at a relatively high level, with a mean score above 3.6. This achievement indicates that interactions in digital spaces can create a significant sense of togetherness and social bonding among users. However, this digital solidarity does not completely replace the identity and social bonds formed through offline interactions. This indicates a complementary relationship: digital spaces strengthen, expand, and accelerate the reach of social solidarity, but do not necessarily erase the basis of solidarity rooted in direct experience in the real world.

These findings have important implications for analyzing the transformation of social structures. First, digital space is now not only a medium for communication but also a primary arena for the formation of collective identities and solidarity networks. Second, the fact that digital solidarity has not yet completely replaced offline

identities underscores the limitations of technological mediation in social life. In other words, despite the shift in the role of digital space in shaping new solidarities, the process of negotiation between online and offline identities remains dynamic. This situation demonstrates how digital society is in a transitional phase, where old and new social structures interact, complement each other, and even potentially negate each other.

**Digital Solidarity and the Transformation of Social Identity**

The findings of this study highlight a profound transformation in the way Indonesian urban communities engage in digital interactions. The high intensity of social media use, with most respondents spending over four hours daily on platforms, demonstrates that digital spaces have become the primary locus of social relations. This shift strongly resonates with Castells' (2000) concept of the *network society*, where technology-mediated networks shape identity, communication, and collective action. It also confirms that digital media are no longer auxiliary to face-to-face interactions, but rather the central infrastructure of social life for younger, productive age groups.

Nevertheless, the research also shows a kind of ambivalence on the power distribution with the digital spaces. On the one hand, the respondents confirm that social media provide them with greater means of expression and involvement, thus, that social media is more democratizing in character. In contrast, the views of algorithmic bias and disparate visibility refer to the continuation of invisible hierarchies. This contradiction can be traced to the critiques of platform capitalism (Srnicek, 2017), whereby corporate ownership of data and algorithms creates new sources of inequality in the context of the supposedly open rhetoric. The conflict between inclusion and exclusion also proves that digital society is not only flattening the hierarchies, but also actively reorganizing them, using algorithmic governance and ownership of data.

The results also highlight the importance of digital platforms to the development of solidarity and identity. The strong sense of belonging to the online communities of respondents is a testimony that digital spaces develop new types of collective identity that no longer relate to the geographic locations. This fact can be combined with the data presented by Baym (2015) when the author claims that an online community can foster a strong social connection even without the physical closeness. However, the fact that offline identity persists shows the existence of a continuing negotiation between digital and traditional solidarity styles. The inter-relationship between online and offline identities suggests that digital transformation cannot be regarded as a revolutionary process but rather as an evolutionary one and thus as creating hybrid social structures.

Lastly, the results contribute to the enhanced discussion related to digital disparity and societal change. The presence of digital divides, both access and algorithmic, highlights the idea of the digital society as not a level playing field but a conflict zone where power is in a constant negotiation process. Based on this, the changes in social formations should not be seen as the act of replacing the physical with the digital form of interaction, rather the development of a dual system that consists of both democratizing the possibilities and the covert control.

## CONCLUSION

This study demonstrates that the structure of social relations in digital society is undergoing significant transformation. Social network analysis and survey findings indicate that digital platforms serve not merely as tools for communication, but as active arenas for the formation of identity, solidarity, and influence. While digital interactions enable broader connectivity and foster new forms of social cohesion,

they do not entirely replace offline identities or face-to-face interactions. Instead, digital and physical social spaces coexist, interact, and sometimes compete, shaping a hybrid social reality.

The research further highlights the ambivalent nature of digital social structures. On one hand, digital platforms democratize participation by allowing individuals to engage, express opinions, and form communities across geographic and social boundaries. On the other hand, the concentration of interactions around key actors, the influence of platform algorithms, and the emergence of clustered communities reflect persistent inequalities and hierarchies. This underscores that digital society, while seemingly open and horizontal, remains structured by both visible and hidden forms of power.

Finally, the findings emphasize that the role of digital networks extends beyond connectivity to the active construction of social meaning. Digital spaces facilitate the creation of new solidarities and identities, yet they also require critical awareness of structural limitations and potential fragmentation. As such, understanding the transformation of social structures in the digital era demands an integrated perspective that considers both quantitative network patterns and the subjective experiences of users. Future research should continue to explore how digital and offline social structures interact, as well as the implications of these dynamics for social cohesion, participation, and equity in increasingly networked societies.

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