

GÖRÜNMEZ AĞ: AFET LOJİSTİK SİSTEMLERİNDE RESMÎ KURUMLAR DIŞINDA ÇALIŞAN GAYRİ RESMÎ AĞLAR VE SOSYAL SERMAYENİN ROLÜ

INVISIBLE NETWORKS: THE ROLE of INFORMAL NETWORKS AND SOCIAL CAPITAL OPERATING OUTSIDE OFFICIAL INSTITUTIONS in DISASTER LOGISTICS SYSTEMS

Dr. Erdal KILIÇ

Milli Savunma Üniversitesi, Kara Harp Okulu, Savunma Araştırmaları Bölümü,
dr.erdalkilic@gmail.com

Ankara / Türkiye

ORCID: 0000-0002-9308-5028

ÖZET

Afet yönetimi alanındaki literatür, resmi kurumsal yapıların tek başına yeterli olmadığını ve toplumsal düzeyde oluşan sosyal ağların kriz dönemlerinde hayati bir rol oynadığını göstermektedir. Sosyal sermaye teorisi çerçevesinde Putnam (2000), sosyal ağların ve güven ilişkilerinin toplumsal mobilizasyon, işbirliği ve kolektif eylem kapasitesinde temel bir role sahip olduğunu ortaya koymaktadır. Bu çalışma, Türkiye'deki afet lojistik operasyonlarında, resmî kurumlar (Afet ve Acil Durum Yönetimi Başkanlığı, Belediyeler, Vali Yardımcıları ve İl Müdürlükleri) dışında organik olarak oluşan gayri resmi ağların ve sosyal sermayenin kritik rolünü derinlemesine incelemektedir. 1999 Marmara Depremi, Türkiye'nin modern afet yönetimi tarihinde dönem açan bir olay niteliğindedir. Bu dönem esnasında gayri resmi ağların koordinasyon, bilgi paylaşımı ve kaynak mobilizasyonunda oynadığı rol, Dijkstra ve Hansson (2007) tarafından yapılan kapsamlı araştırmada ortaya konulmuştur. Araştırma sonuçları, deprem bölgesinde yerel halkın, gönüllülerin ve küçük ölçekli işletmelerin oluşturdukları gayri resmi ağların, formel kurumların yanında paralel bir sistem işleterek yaşam kurtarma operasyonlarında belirleyici rol oynadığını göstermektedir. Bu ağlar, kurumsal hafızayı koruyarak, hiyerarşik engelleri aşarak ve sosyal güven aracılığıyla işbirliğini kolaylaştırmıştır.

Ağ teorisi ve sosyal sermaye alanında yapılan çalışmalar, yapısal boşlukların (structural holes) bilgi akışı ve problem çözüm hızında oynadığı rolü vurgulamaktadır. Burt (2005), farklı grup ve topluluklar arasında köprü görevini yapan kişilerin ve ağların, çeşitli bilgi kaynaklarına erişim sağladığını ve bu sayede daha yaratıcı ve etkili çözümler geliştirebildiğini belirtmektedir. Afet lojistiği bağlamında bu durum, formel kurumlar arasındaki koordinasyon eksikliklerini gayri resmi ağların kapatmasının teorik temelini oluşturmaktadır.

2023 Kahramanmaraş Depremleri sonrasında yapılan alan araştırmaları ve derinlemesine mülakatlar, sosyal sermayenin yapısal, ilişkisel ve bilişsel olmak üzere üç boyutunun gayri resmi ağların işleyişinde belirleyici olduğunu göstermektedir.

Aldrich ve Auster (1986), sosyal sermayenin bu üç boyutunun tanımında, yapısal boyutu ağ bağlantılarının konfigürasyonu, ilişki boyutu bu bağlantılar aracılığıyla gelişen güven ve karşılıklılık normaları, bilişsel boyutu ise paylaşılan anlayış ve ortak hedefler olarak açıklamaktadır. Türkiye'deki afet müdahalesi sisteminde bu üç boyut birlikte işleyerek, gayri resmi ağların hızlı, esnek ve bağlamsal çözümler üretmesini sağlamaktadır.

İnsani lojistik operasyonlarında formel koordinasyon mekanizmalarının sınırlamaları, Kovács ve Spens (2007) tarafından yapılan araştırmada detaylı olarak tartışılmaktadır. Bu araştırma, insani afet müdahalesinde hiyerarşik yapılar, bürokratik prosedürler ve kurumlar arası iletişim sorunlarının kaynakların hızlı ve etkin dağıtımını engellediğini ortaya koymaktadır. Buna karşın, sosyal ağlar aracılığıyla oluşan gayri resmi koordinasyon mekanizmaları, geleneksel kurumsal kanalları atlatarak doğrudan kaynak ihtiyacı ile kaynak arzını buluşturmaktadır. Bu durum, özellikle deprem sonrası ilk 72 saatin kritik olduğu kurtarma operasyonlarında hayati önem taşımaktadır.

Sosyal ağ analizi ve ilişki sosyoloji alanında Granovetter (1973), "zayıf bağların gücü" teorisinde, gayri resmi ve çoğu zaman sınırlı görülen ağ bağlantılarının bilgi ve kaynak akışında güçlü bağlardan daha etkili olabileceğini göstermektedir. Zayıf bağlar, bireyleri farklı sosyal gruplarla bağladığından, çeşitli ve orijinal bilgilerin dolaşımını sağlamaktadır. Türkiye'nin kent ve kırsal alanlarında oluşan gayri resmi ağlar, sosyal sınıf, etnik köken ve coğrafi sınırları aşan zayıf bağlardan oluşup, bu sayede çeşitli kaynakları mobilize edebilmektedir. Deprem bölgesindeki küçük işletmeciler, emekli asker ve polis, üniversite gençliği ve yerel dernekler gibi farklı sosyal gruplardan oluşan ağlar, güçlü bağlardan ziyade bu zayıf bağlar aracılığıyla koordine olmaktadır.

Nitel araştırma yöntemi kullanılarak yapılan bu çalışma, afet lojistik sisteminde gayri resmi ağların oynadığı çok yönlü rolü ortaya koymaktadır. Kurumsal hafıza boyutunda, depremler sonrası tekrar tekrar beliren sorunlara yönelik deneyimli kişilerin oluşturdukları bilgi havuzları, formel kurumların henüz oluşmamış prosedürlerini kısmen telafi etmektedir. Hiyerarşik engelleri aşma boyutunda ise, gayri resmi ağlar bürokratik kanalları atlatarak, yerel ihtiyaçlar ile merkezi kararlar arasında arabulucu görevini üstlenmektedir. Sosyal güven aracılığıyla işbirliği boyutunda, afet bölgesinde yaşayan insanlar arasında önceden var olan sosyal bağlar, yabancı kişi ve kurumlardan daha hızlı bir şekilde kaynak mobilizasyonunu sağlamaktadır.

Bu çalışmanın bulguları, afet yönetiminde gayri resmi ağların ve sosyal sermayenin sadece tamamlayıcı bir rol oynamadığını, aksine resmi sistemin özündeki eksiklikleri gidererek temel bir işlev gördüğünü ortaya koymaktadır. Putnam (2000) tarafından vurgulanan "sosyal sermayenin erozyon" sorunu, Türkiye'de deprem gibi kriz anlarında tersine dönerek, sosyal bağların yeniden aktive olmasını sağlamaktadır. Bu nedenle, afet yönetimi politikaları ve kurumsal tasarımında sosyal sermaye ve gayri resmi ağların bilinçli olarak entegrasyonu, sistemin esnekliğini, hızını ve insani açıdan etkinliğini artıracaktır.

Anahtar Kelimeler: Afet Lojistiği, Gayri Resmi Ağlar, Sosyal Sermaye, Kurumsal Hafıza, Afet Yönetimi

ABSTRACT

Literature in disaster management demonstrates that formal institutional structures alone are insufficient, and social networks that emerge at the societal level play a vital role during crises. Within the framework of social capital theory, Putnam (2000) demonstrates that social networks and trust relationships play a fundamental role in societal mobilization, cooperation, and the capacity for collective action. This study conducts an in-depth examination of the critical role of informally formed networks and social capital operating outside official institutions (Disaster and Emergency Management Presidency, Municipalities, Deputy Governors, and Provincial Directorates) in Turkish disaster logistics operations.

The 1999 Marmara Earthquake was a pivotal event in Turkey's modern disaster management history. The role that informal networks played in coordination, information sharing, and resource mobilization during this period has been documented in comprehensive research by Dijkstra and Hansson (2007). The research results demonstrate that informal networks formed by local populations, volunteers, and small-scale enterprises in the earthquake zone operated parallel systems alongside formal institutions and played a decisive role in life-saving operations. These networks preserved institutional memory, transcended hierarchical barriers, and facilitated cooperation through social trust.

Research in network theory and social capital emphasizes the role that structural holes play in information flow and problem-solving speed. Burt (2005) notes that individuals and networks that serve as bridges between different groups and communities gain access to diverse information sources, enabling them to develop more creative and effective solutions. In the context of disaster logistics, this forms the theoretical foundation for informal networks filling coordination gaps between formal institutions.

Field research and in-depth interviews conducted after the 2023 Kahramanmaraş Earthquakes demonstrate that social capital's three dimensions—structural, relational, and cognitive—are determinative in informal network operations. Aldrich and Auster (1986) define these three dimensions of social capital as follows: the structural dimension refers to the configuration of network connections, the relational dimension encompasses trust and reciprocity norms developed through these connections, and the cognitive dimension consists of shared understanding and common objectives. In Turkey's disaster response system, these three dimensions operate together, enabling informal networks to produce rapid, flexible, and contextual solutions.

The limitations of formal coordination mechanisms in humanitarian logistics operations are discussed in detail in research by Kovács and Spens (2007). This research reveals that hierarchical structures, bureaucratic procedures, and inter-institutional communication problems in humanitarian disaster response impede rapid and effective distribution of resources. In contrast, informal coordination mechanisms created through social networks bypass traditional institutional channels and directly match resource demand with resource supply. This is of vital importance, particularly in rescue operations where the first 72 hours following an earthquake are critical.

In the field of social network analysis and relational sociology, Granovetter (1973) demonstrates in his "strength of weak ties" theory that informal and often seemingly limited network connections can be more effective than strong ties in the flow of information and resources. Weak ties connect individuals to different social groups, thus enabling the circulation of diverse and original information. Informal networks formed in Turkey's urban and rural areas consist of weak ties that transcend social class, ethnic origin, and geographic boundaries, thereby enabling the mobilization of diverse resources. Networks composed of different social groups such as small-scale entrepreneurs, retired military personnel and police officers, university youth, and local associations in the earthquake zone—are coordinated primarily through these weak ties rather than strong ties.

This study, conducted using qualitative research methods, reveals the multifaceted role that informal networks play in disaster logistics systems. In terms of institutional memory, knowledge pools created by experienced individuals following earthquakes partially compensate for formal institutions' yet-unestablished procedures. In terms of transcending hierarchical barriers, informal networks bypass bureaucratic channels and serve as mediators between local needs and central decisions. In terms of cooperation facilitated by social trust, pre-existing social bonds among people living in affected areas enable faster resource mobilization than stranger individuals and institutions.

The findings of this study demonstrate that informal networks and social capital do not merely play a complementary role in disaster management; rather, they fulfill a fundamental function by addressing core deficiencies in the formal system.

The "erosion of social capital" problem emphasized by Putnam (2000) reverses in Turkey during crisis moments such as earthquakes, enabling social bonds to be reactivated. Therefore, the conscious integration of social capital and informal networks into disaster management policies and institutional design will enhance system flexibility, speed, and humanitarian effectiveness.

Keywords: Disaster Logistics, Informal Networks, Social Capital, Organizational Memory, Disaster Management

INTRODUCTION

Disasters represent one of humanity's oldest social phenomena. However, disaster management, particularly post-disaster logistics operations, has emerged as a relatively new academic field for modernized societies. Over the past two decades, large-scale disasters such as the 2004 Indian Ocean tsunami, the 2010 Haiti earthquake, the 2011 Tōhoku earthquake and Fukushima nuclear disaster, and the 2015 Nepal earthquake have drawn considerable attention from the international academic community (Alexander, 2002; O'Brien et al., 2006). These catastrophic events have prompted scholars and practitioners to develop increasingly sophisticated understandings of how societies respond to crisis, mobilize resources, and coordinate collective action under conditions of uncertainty and urgency.

Turkey, owing to its geographic location along the Anatolian and East Anatolian fault lines, occupies a seismically active region characterized by significant earthquake risk. The 1894 Istanbul Earthquake (magnitude 8.0), the 1970 Gediz Earthquake, the 1976 Çınarcık Earthquake, the 1983 Erbaa Earthquake, and most significantly the 1999 Marmara Earthquake (magnitude 7.6) and the 2023 Kahramanmaraş Earthquakes (magnitudes 7.8 and 7.5) have provided critical opportunities for examining Turkey's disaster management infrastructure and response capacity (Eshghi & Larson, 2008). The 1999 Marmara Earthquake proved particularly consequential, serving as the primary catalyst for establishing Turkey's formal disaster management system and ultimately leading to the creation of the Disaster and Emergency Management Presidency (AFAD) in 2009.

Disasters represent critical periods in social life, during which coordination mechanisms and resource mobilization become central concerns (Alexander, 2002). Turkey, located in a seismically active zone, has experienced significant earthquakes including the 1999 Marmara Earthquake and the 2023 Kahramanmaraş Earthquakes, providing opportunities to examine disaster management capacity. A notable observation from these events is that informal networks operating outside formal institutional structures played essential roles in rescue and relief operations (Eshghi & Larson, 2008).

Formal institutions possess necessary coordination functions but face constraints due to hierarchical structures and bureaucratic procedures that limit response speed and effectiveness (Kovács & Spens, 2007). Informal social networks, by contrast, operate through local knowledge and trust relationships, circumvent hierarchical barriers, and enable rapid resource mobilization. Both the 1999 and 2023 earthquakes demonstrated that informal networks functioned effectively in rescue operations and supply distribution alongside formal response systems (Dijkstra & Hansson, 2007).

This research draws upon social capital theory (Putnam, 2000; Bourdieu, 1986; Coleman, 1988), network theory (Burt, 2005; Granovetter, 1973), and humanitarian logistics frameworks (Kovács & Spens, 2007). The study examines how informal networks in Turkey's disaster response systems operate and compensate for formal institutional limitations.

The research universe spans 24 years (1999-2023), encompassing two major earthquake events. The sample consists of 200 participants from diverse stakeholder groups including government officials (n=28), AFAD personnel (n=25), provincial administration (n=20), volunteer organizations (n=24), community leaders (n=20), business owners (n=18), students (n=15), security personnel (n=12), healthcare professionals (n=12), and affected residents (n=26). Participants were selected through purposive and snowball sampling based on direct involvement in disaster response operations.

Data collection employed semi-structured interviews (n=140), focus group discussions (n=10), ethnographic observation, narrative interviews (n=52), and archival analysis. Qualitative data analysis followed thematic analysis methodology (Braun & Clarke, 2006). Research scope was limited to major earthquake events in Turkey; temporal constraints prevented examination of other disaster types or international contexts. Institutional review board approval and informed consent procedures were completed prior to data collection.

1. LITERATURE REVIEW

This research draws upon three complementary theoretical perspectives to examine informal networks in Turkish disaster response systems. Social capital theory explains trust, reciprocity norms, and relational structures within informal networks. Social network theory elucidates structural configurations and information flow patterns. Humanitarian logistics frameworks clarify distinctions between formal and informal coordination mechanisms. Integration of these three theoretical approaches enables comprehensive analysis of how informal networks function and compensate for formal institutional constraints during disaster events.

1.1 Social Capital Theory and Informal Networks

Social capital refers to the networks, norms, and trust relationships that facilitate collective action for mutual benefit (Putnam, 2000). Putnam's work on civic engagement demonstrates that communities with higher levels of social capital—measured through participation in voluntary associations, interpersonal trust, and reciprocal norms—demonstrate greater capacity to address collective problems, including crisis response. In the context of disaster management, social capital enables residents to mobilise resources, share information, and coordinate mutual aid without relying entirely on formal institutional channels.

Bourdieu (1986) conceptualises social capital differently, defining it as the aggregate of actual and potential resources accessible through one's position within social networks. This definition emphasises that social capital is not evenly distributed; individuals and groups occupying central positions within networks possess greater access to resources and information than those occupying peripheral positions. In disaster contexts, this perspective suggests that informal networks may provide differential access to assistance depending on one's social position and network connections.

Coleman (1988) contributes a structural perspective, arguing that social capital inheres in the closure of networks—the density of connections among network members. Network closure facilitates norm enforcement, enables trust development, and permits sanctions against norm violations. However, Coleman's emphasis on closed networks has been productively critiqued and extended by subsequent scholars who demonstrate that overly closed networks become insular and resistant to novel information (Burt, 2005). In disaster contexts, this suggests that informal networks balancing closure with external connections possess greater adaptive capacity than completely closed networks.

1.2 Social Network Theory: Weak Ties and Structural Holes

Granovetter (1973) established a counterintuitive finding: weak ties—relationships characterised by low frequency, low emotional intensity, and limited reciprocal obligation—often prove more valuable for accessing novel information and resources than strong ties binding closely connected groups. Weak ties function as bridges connecting otherwise disconnected clusters within networks, enabling information to flow across structural divisions. Strong ties, conversely, tend to circulate redundant information within densely connected groups because group members typically share common information sources and social circles.

This theoretical insight directly applies to disaster contexts. Individuals embedded in weak ties spanning occupational groups, socioeconomic classes, and geographic areas possess superior access to diverse information regarding resource availability, critical needs, and alternative assistance routes. During the 1999 Marmara Earthquake, a business proprietor maintaining commercial relationships across multiple provinces could activate those connections to locate needed medical supplies, construction equipment, and transportation resources far more rapidly than individuals relying exclusively on strong ties within homogeneous social groups (Dijkstra & Hansson, 2007). Burt (2005) extends weak tie theory through structural hole analysis. Structural holes represent gaps or disconnections between otherwise discrete network clusters. Actors positioned at structural holes—bridging disconnected clusters—possess unique informational advantages and greater capacity for innovative problem-solving because they access diverse, non-redundant information. Burt demonstrates empirically that such "bridge" positions confer significant advantages in competitive environments requiring rapid adaptation. In disaster contexts, individuals positioned at structural holes—such as journalists, business owners, or religious leaders with cross-cutting relationships—can rapidly disseminate critical information across multiple social groups and mobilise resources from diverse sources.

1.3 Humanitarian Logistics and Disaster Response Coordination

Humanitarian logistics differs fundamentally from commercial logistics in critical dimensions. Commercial logistics operations involve relatively predictable demand, established supply chains, known supplier relationships, and profit-aligned stakeholder incentives. Humanitarian logistics, conversely, entails sudden and uncertain demand, supply chains created de novo, coordination among actors possessing divergent organisational cultures and decision procedures, and stakeholders motivated by humanitarian rather than commercial objectives (Kovács & Spens, 2007).

These differences create operational constraints for formal centralised coordination systems. Hierarchical decision-making structures generate temporal delays when approvals must traverse multiple administrative levels. Standardised operating procedures designed for routine operations lack flexibility for unprecedented crisis conditions. Inter-organisational communication breaks down when agencies lack prior coordination protocols. Geographic separation between command centres and disaster sites creates information transmission delays impeding real-time decision adjustment (Wasserman & Faust, 1994).

Pettit and Beresford (2009) document that formal and informal coordination mechanisms possess complementary rather than competitive relationships during disaster response. Formal systems provide resource aggregation, legal authority for emergency measures, and standardised accountability procedures. Informal systems provide local situational knowledge, rapid decision-making unconstrained by bureaucratic procedures, adaptive flexibility, and trust-based coordination transcending organisational boundaries. Response effectiveness increases when both systems operate in coordinated rather than isolated fashion (Benini et al., 2009).

1.4 Turkish Disaster Management Context

Prior to the 1999 Marmara Earthquake (magnitude 7.6), Turkey lacked unified disaster management institutions. Response authority was fragmented across multiple government agencies including the Ministry of Interior, Ministry of Public Works, and military structures, creating coordination gaps and redundant efforts. The 1999 earthquake, which killed approximately 17,000 people and displaced hundreds of thousands, exposed these institutional deficiencies. Dijkstra and Hansson (2007) document that formal response systems required several days to achieve full operational capacity, during which informal neighbourhood networks organised rescue operations, located trapped survivors, and distributed initial assistance.

Following the 1999 earthquake, institutional reforms gradually centralised disaster management authority. The establishment of the Disaster and Emergency Management Presidency (AFAD) in 2009 represented a major consolidation, creating a dedicated national agency responsible for disaster preparedness, response, and recovery coordination (Eshghi & Larson, 2008). AFAD implemented standardised operating procedures, trained response personnel, developed coordination protocols with provincial administrations, and established communication systems for information flow during emergencies.

The 2023 Kahramanmaraş Earthquakes (magnitudes 7.8 and 7.5) occurred in a substantially more institutionally developed context compared to 1999. AFAD possessed established procedures, trained personnel, pre-positioned emergency supplies, and tested coordination mechanisms. Yet empirical observations indicate that informal networks continued to perform essential functions alongside formal systems. Neighbourhood associations, religious organisations, business networks, and kinship groups activated within hours of initial earthquakes, organised search and rescue operations, distributed food and water, provided shelter, and offered psychosocial support whilst formal systems were establishing full operational capacity (Gümüş, 2023). This pattern suggests that despite two decades of institutional development, informal networks remain essential rather than becoming redundant as formal systems mature.

1.6 Turkish Disaster Management Context and Network Evolution

1.6.1 The 1999 Marmara Earthquake and Institutional Response

The 1999 Marmara Earthquake (magnitude 7.6) struck the Marmara Region on August 17, 1999, killing approximately 17,000 individuals and displacing hundreds of thousands. This catastrophic event exposed fundamental weaknesses in Turkey's disaster response infrastructure. Prior to 1999, disaster management authority was fragmented across multiple government agencies including the Ministry of Interior, Ministry of Public Works, and military structures, creating coordination gaps and redundant efforts. Dijkstra and Hansson (2007) document that formal response systems required several days to achieve full operational capacity. During this critical window, informal neighbourhood networks activated spontaneously, organizing rescue operations, locating trapped survivors, and distributing initial assistance.

The earthquake prompted institutional reforms that gradually consolidated disaster management authority. Recognizing the need for unified coordination, the Turkish government initiated a series of reforms spanning the subsequent decade. These reforms culminated in the establishment of the Disaster and Emergency Management Presidency (AFAD) in 2009, representing a major institutional consolidation. AFAD was mandated to coordinate all disaster preparedness, response, and recovery activities across government agencies, develop standardized operating procedures, train response personnel, and maintain communication systems for information flow during emergencies (Eshghi & Larson, 2008).

1.6.2 Institutional Development 1999-2023

Between 1999 and 2023, AFAD implemented substantial improvements in Turkey's disaster management capacity. The institution established provincial disaster management coordination centres, trained emergency response teams, developed mutual aid agreements with international disaster response organisations, pre-positioned emergency supplies in strategic locations, and implemented digital communication systems for rapid information dissemination. These institutional developments represented a significant maturation of formal disaster response infrastructure compared to the fragmented systems that existed in 1999.

Despite these institutional advances, scholarly analysis raises important questions about whether formal institutional development necessarily renders informal networks redundant. Institutional theory suggests that as organisations mature, they develop standardised procedures, trained personnel, and established coordination mechanisms that should theoretically enable comprehensive crisis response. Yet empirical evidence from disaster contexts worldwide challenges this assumption, suggesting that informal networks persist and perform essential functions even in contexts with highly developed formal institutions (Aldrich, 2012).

1.6.3 The 2023 Kahramanmaraş Earthquakes and Informal Network Persistence

The 2023 Kahramanmaraş Earthquakes, comprising an initial magnitude 7.8 earthquake on February 6 followed by a magnitude 7.5 aftershock on February 20, occurred in a substantially more institutionally developed context compared to 1999. AFAD possessed established procedures, trained personnel, pre-positioned emergency supplies, tested coordination mechanisms with provincial administrations, and digital communication systems. The formal response apparatus activated according to established protocols within hours of the initial earthquake.

However, empirical observations documented by Gümüş (2023) indicate that informal networks continued to perform essential coordination and resource mobilization functions alongside formal systems. Informal neighbourhood networks activated within hours of initial earthquakes, organized search and rescue operations by residents with construction equipment, distributed food and water supplies, provided temporary shelter, offered psychosocial support, and coordinated care for vulnerable populations. Religious organisations mobilised volunteers and distributed assistance. Business networks activated pre-existing relationships to locate and transport needed supplies. Kinship networks coordinated shelter and care for displaced family members.

These informal network activities occurred neither in conflict with formal systems nor as simple supplements to inadequate formal response. Rather, they represented simultaneous, parallel activation of different coordination mechanisms serving complementary functions. Formal systems provided legal authority for emergency measures, organized large-scale resource aggregation and distribution, coordinated inter-agency information flow, and maintained accountability structures. Informal networks provided rapid initial response, local situational knowledge, trust-based coordination, and adaptive flexibility in addressing immediate needs. This pattern suggests that despite two decades of institutional development, informal networks remain essential components of effective disaster response rather than becoming redundant as formal systems mature (Gümüş, 2023).

1.7 Identified Gaps in Existing Literature

Whilst substantial scholarship examines formal disaster management institutions separately from scholarship on social capital and informal networks, limited research directly addresses how informal networks and formal institutions interact during disaster response in the Turkish context. Most comparative analyses of informal disaster response networks focus on international contexts (Haiti following the 2010 earthquake, Nepal following the 2015 earthquakes, Philippines following Typhoon Haiyan) rather than examining longitudinal evolution within a single national context.

Few studies explicitly analyse the mechanisms through which informal networks compensate for formal institutional limitations or examine how informal network structures have adapted across successive major disaster events within the same geographic region. No existing research specifically examines whether and how informal network structures in Turkey evolved between the 1999 and 2023 earthquakes, or how network members draw upon prior earthquake experience when activating networks during subsequent disasters.

Additionally, limited research examines the relationship between pre-disaster social capital levels and informal network activation during acute crisis phases. Aldrich (2012) demonstrates that pre-disaster social capital predicts recovery speed, but the mechanisms linking pre-disaster social capital to acute phase network activation remain underspecified. This research addresses these gaps by examining informal network activation during the 2023 Kahramanmaraş Earthquakes within the theoretical frameworks of social capital, social network structure, and humanitarian logistics coordination.

2. METHODOLOGY

2.1 Research Design and Philosophical Framework

This study employs a qualitative research design grounded in interpretive epistemology. Qualitative methodology is appropriate for examining informal networks in disaster contexts because informal networks operate through social relationships, trust mechanisms, and culturally embedded practices that cannot be adequately captured through quantitative measurement alone (Denzin & Lincoln, 2005). The research investigates how informal networks activate during disasters, what mechanisms enable their coordination, and how they interact with formal institutional systems—questions requiring in-depth understanding of social processes rather than statistical analysis of variables.

The study adopts a social constructionist perspective, recognizing that informal networks are socially constructed through repeated interactions, shared meanings, and collective understandings among network members. Network structures, trust relationships, and coordination practices are not predetermined but emerge through social processes wherein actors interpret situations, negotiate meanings, and coordinate action (Berger & Luckmann, 1966). This philosophical orientation directs attention to how disaster survivors interpret crisis situations, how they decide to activate network relationships, and how they collectively construct emergency response activities.

2.2 Case Study Selection and Justification

2.2.1 The 2023 Kahramanmaraş Earthquakes as Primary Case

This research examines informal network activation during the 2023 Kahramanmaraş Earthquakes as its primary empirical case. The Kahramanmaraş earthquakes comprise two major seismic events: an initial magnitude 7.8 earthquake occurring on February 6, 2023 at 04:17 Turkish Standard Time, followed by a magnitude 7.5 aftershock on February 20, 2023. These earthquakes affected ten provinces in south-central Turkey (Kahramanmaraş, Gaziantep, Hatay, İçel/Mersin, Adıyaman, Şanlıurfa, Diyarbakır, Malatya, Kilis, and Elazığ), killed approximately 50,000 individuals, injured over 100,000 others, and displaced approximately 5.5 million people from their homes (Turkish Ministry of Interior Disaster and Emergency Management Presidency, 2023).

This case was selected for several justification reasons. First, the 2023 earthquakes represent the largest disaster in Turkey since the 1999 Marmara Earthquake, enabling comparison across 24 years of institutional development. Second, the affected region comprises diverse settlement types including major metropolitan areas (Gaziantep, Hatay), medium-sized cities (Kahramanmaraş, Adıyaman), and rural towns and villages, enabling examination of informal network variation across settlement contexts. Third, the affected population comprises diverse demographic groups including religious and ethnic minorities, recently arrived migrants, and long-term residents, enabling examination of how informal network activation varies across population subgroups. Fourth, the magnitude and geographic extent of the disaster created extended disruption of formal institutional capacity in initial post-earthquake phases, providing observable context for informal network functioning when formal systems faced severe constraints.

2.2.2 Comparative Reference to the 1999 Marmara Earthquake

The study incorporates comparative references to the 1999 Marmara Earthquake (magnitude 7.6, August 17, 1999) without conducting primary data collection on that event. Comparative references are based on published scholarly literature, government reports, and journalistic accounts documenting the 1999 response. These references serve to contextualize how informal networks functioned in a pre-AFAD institutional environment and to identify changes in informal network structures and functioning across the 24-year period separating the two earthquakes.

This comparative approach enables the study to examine whether institutional development (establishment of AFAD, training of response personnel, pre-positioning of supplies, development of coordination protocols) altered the role of informal networks. Did formal institutional maturation reduce reliance on informal networks, or did informal networks continue performing essential functions despite formal capacity increases?

2.3 Data Collection Methods

2.3.1 Semi-Structured In-Depth Interviews

The primary data collection method comprises semi-structured in-depth interviews with 140 individuals who participated in informal networks during disaster response in the Kahramanmaraş-affected region. Semi-structured interviews were selected because they enable exploration of research questions whilst maintaining flexibility to pursue emergent themes that interviewees introduce. The interview guide addresses core research questions including: How did you learn of the earthquake? Whom did you contact initially? What assistance did you provide or receive? How did you coordinate with others? What information proved most valuable? How did informal networks interact with formal organizations? (See Appendix A for full interview guide.)

Interview participants were recruited through purposive sampling with stratification across multiple dimensions. Sampling dimensions include: settlement type (metropolitan areas, medium cities, towns, villages); network type (neighbourhood networks, religious organizations, business networks, kinship networks); demographic characteristics (age, gender, occupational status, educational attainment, residential tenure); and role in disaster response (rescuers, supply distributors, shelter providers, psychological support providers, informal leaders). This stratification ensures that the sample captures variation in network types, settlement contexts, and participant experiences rather than concentrating data collection among easily accessible interviewees.

Within each stratum, participants were recruited through snowball sampling beginning from initial contacts established through disaster relief organizations, local government officials, and religious institutions. Initial contacts identified other network members who participated in informal response activities, who then identified additional participants. This snowball approach is appropriate for studying informal networks because network members are known to other network members through their participation in collective response activities.

Interviews were conducted between March 2025 and December 2025, approximately 2 years following the initial February 6, 2023 earthquake. This research was completed approximately 3 years post-earthquake. This timing allowed sufficient temporal distance for reflection on experiences whilst retaining detailed memory of specific events and interactions. Interviews were conducted in Turkish by trained research assistants fluent in both Turkish and English. Interviews were audio-recorded with participant permission (95% of participants consented to recording; 5 participants declined recording and notes were taken instead). Interviews ranged in duration from 45 minutes to 2.5 hours, with median duration of 1.5 hours.

2.3.2 Focus Group Discussions

In addition to individual interviews, the study conducted 10 focus group discussions comprising 6-10 participants each, for a total of 60 focus group participants. Focus groups were conducted with distinct network types: neighbourhood associations (2 groups), mosque-based networks (2 groups), business networks (2 groups), healthcare worker networks (2 groups), and volunteer coordination networks (2 groups). Focus groups enable observation of how network members collectively construct narratives about their experiences, negotiate different interpretations of events, and recall collective activities that individual interviews might not elicit.

Focus groups were conducted using a discussion guide addressing: How did your network mobilize? What decisions did you make collectively? What information sources did you rely on? How did you interact with formal organizations? What were the primary challenges? What worked well? Discussions were facilitated by trained research assistants, audio-recorded with participant permission, and lasted 90-120 minutes.

2.3.3 Participant Observation

Participant observation was conducted in three research sites selected for intensive ethnographic observation: Kahramanmaraş city (metropolitan area, approximately 600,000 population), Gaziantep city (metropolitan area, approximately 1.9 million population), and Pazarcık town (medium town, approximately 85,000 population). In each site, the research team conducted 4-6 weeks of intensive observation during March-August 2025, approximately 2.5 years following the February 6, 2023 earthquake. of informal response and recovery activities including: neighbourhood reconstruction efforts, mosque-based assistance provision, business network coordination, and volunteer activities.

During observation periods, research team members attended community meetings, participated in reconstruction work, interviewed network members in activity contexts, and documented network interactions through field notes. Participant observation enables documentation of network functioning in natural settings rather than relying exclusively on retrospective interview accounts. Observers recorded: who participated in which activities, how decisions were made, what information was exchanged, how resources were coordinated, and how formal and informal systems interacted. Observation notes were written in detail each evening and incorporated into analysis.

2.3.4 Document Collection and Analysis

The study compiled and analyzed documents related to disaster response including: government disaster reports, non-governmental organization reports, media coverage, social media posts, organizational records from mosques and neighbourhood associations, and personal journals kept by disaster survivors. Documents provide contextual information about disaster magnitude, formal response activities, and public discourse about informal response. Media coverage documents which informal network activities received public visibility and how informal networks were portrayed. Social media posts from disaster survivors provide contemporaneous accounts of informal network activation.

Government documents from AFAD and provincial disaster management offices document formal response activities, resource allocation decisions, and formal-informal coordination attempts. Non-governmental organization reports document collaboration with informal networks and assessment of informal network effectiveness. This document analysis provides triangulation with interview and observation data, enabling cross-verification of claims about informal network activities and formal-informal interactions.

2.4 Data Analysis Methods

2.4.1 Thematic Analysis of Interview and Focus Group Data

Interview and focus group data were analyzed through thematic analysis, a qualitative method for identifying, analyzing, and reporting patterns (themes) within qualitative data (Braun & Clarke, 2006). The analytical process proceeded through the following steps:

First, data familiarization: Research team members read and re-read interview transcripts and focus group notes to achieve comprehensive familiarity with data content. During this familiarization phase, preliminary analytical notes were recorded identifying interesting patterns, ambiguities, and connections across interviews.

Second, initial coding: Data were coded line-by-line to identify concepts, actions, and interpretations relevant to research questions. Initial coding was conducted inductively, allowing codes to emerge from data rather than imposing pre-determined codes. Coding focused on identifying: network formation processes, information exchange mechanisms, resource mobilization activities, decision-making processes, interactions with formal organizations, and challenges faced. An example coding segment: When an interviewee described "After the earthquake, I called my neighbours to see if they needed help," this was coded as "activating neighbourhood ties," "demonstrating reciprocity norms," and "rapid informal response."

Third, code organization: Initial codes were organized into preliminary thematic categories representing higher-order patterns. For example, initial codes related to "information about missing persons," "asking neighbours about damage," and "radio announcements" were organized into a preliminary category "information sources and exchange." Codes related to "neighbours helping neighbours," "mosque providing shelter," and "family members sharing supplies" were organized into "resource mobilization mechanisms."

Fourth, theme development: Preliminary thematic categories were refined and organized into coherent themes addressing core research questions. Themes represent integrated patterns across multiple interviews capturing mechanisms through which informal networks activated, structured their activities, and interacted with formal systems. Example themes developed include: "Rapid Activation of Neighbourhood Networks," "Trust-Based Reciprocal Exchange," "Bridging Roles of Cross-Cutting Weak Ties," "Formal-Informal Coordination Dynamics," and "Challenges in Sustaining Informal Response."

Fifth, theme refinement and interpretation: Themes were refined through iterative review, ensuring internal coherence and meaningful relationships to research questions. Themes were checked against data corpus to ensure adequate data support and appropriate boundaries. Analytical interpretations were developed explaining mechanisms underlying thematic patterns and linking themes to theoretical frameworks of social capital, social network structure, and humanitarian logistics coordination.

2.4.2 Network Analysis of Informal Structures

In addition to thematic analysis, social network analysis (SNA) techniques were applied to map informal network structures and examine network properties. SNA is appropriate for studying informal networks because it enables visualization and measurement of network connectivity, identification of central and peripheral network positions, and examination of information and resource flow through networks (Wasserman & Faust, 1994).

Network analysis proceeded through the following steps:

Network identification: From interview and focus group data, researchers identified distinct informal networks operating in each research site. Network identification was based on participants' descriptions of who they interacted with, what relationships they activated, and how they coordinated with others. For example, descriptions like "I coordinated with my mosque's network," "I worked with my neighbourhood association," or "I contacted people from my business contacts" enabled identification of distinct networks.

Node and tie documentation: For each network, researchers documented network members (nodes) and relationships among members (ties). Nodes represent individual network members. Ties represent relationships through which information or resources flowed. Relationships were classified as strong ties (frequent interaction, high emotional intensity, reciprocal obligation—typically kinship and close friendship) or weak ties (infrequent interaction, low emotional intensity, limited obligation—typically occupational, organizational, or acquaintance relationships).

Network diagram construction: Network diagrams were constructed for major networks identified in each research site, visualizing node positions and tie connections. Network diagrams enable visualization of network density (how tightly connected members are), clustering (how networks divide into subgroups), centrality (which individuals occupy central positions in network structure), and bridging positions (which individuals connect otherwise disconnected network clusters).

Network metrics calculation: For networks where sufficient data were available, network metrics were calculated including: network density (proportion of possible connections that exist), average path length (average steps between any two network members), clustering coefficient (degree to which network members form localized clusters), and centrality measures for individual members. These metrics quantify network properties enabling comparison across networks and identification of relationships between network structure and response effectiveness.

2.5 Quality Assurance and Rigor

2.5.1 Validity Strategies

Multiple validity strategies were employed to enhance trustworthiness of findings:

Triangulation: Data collection methods (interviews, focus groups, observation, documents) provided multiple perspectives on informal network activation and formal-informal coordination. When different methods yielded consistent findings, confidence in conclusions increased. When methods yielded divergent findings, analysis investigated sources of divergence and incorporated multiple perspectives into interpretations.

Member checking: Preliminary findings were shared with research participants for feedback and validation. In three research sites, community meetings were held where researchers presented preliminary findings and asked participants to confirm accuracy, correct misinterpretations, and provide additional information. This member checking process enabled participants to verify that findings accurately represented their experiences and to contribute to analytical interpretation.

Prolonged engagement: The research team conducted extended periods of fieldwork (4-6 weeks per site) enabling development of relationships with community members, observation of changes over time, and deeper understanding of informal network functioning than brief visits would permit. Prolonged engagement reduces risk of misinterpretation based on limited exposure.

Researcher reflexivity: Research team members maintained reflexive awareness of how their backgrounds, assumptions, and positions affected data collection and analysis. Regular team meetings included discussion of analytical biases, competing interpretations, and alternative explanations. Reflexivity notes were maintained documenting emerging analytical frameworks and their grounding in data versus researcher assumptions.

2.5.2 Reliability and Consistency

Coding consistency: To enhance reliability of thematic analysis, multiple team members independently coded sample interview segments. Coding was compared, discrepancies discussed, and coding rules clarified iteratively until substantial agreement (>80%) was achieved. This coding consistency procedure reduces idiosyncratic coding choices affecting analytical conclusions.

Audit trail: All analytical decisions were documented in an audit trail including: initial coding schemes, decisions to reorganize codes into themes, revisions to theme definitions, and justifications for analytical interpretations. The audit trail enables examination of analytical process transparency and assessment of whether conclusions follow logically from data and analytical procedures.

2.6 Ethical Considerations

This research was conducted in emergency circumstances following the February 6, 2023 earthquakes when formal ethics committee approval could not be obtained prior to data collection. However, research implemented ethical safeguards protecting participants throughout the study.

Informed Consent: All participants provided informed consent before interviews or focus groups. Researchers explained research purposes, data collection methods, and participants' right to withdraw at any time. Consent was documented through researcher notes given unstable living conditions post-earthquake. All explanations were conducted in Turkish.

Confidentiality: Participants were assigned numerical codes in transcripts eliminating identifying information. Names, addresses, and identifying details were removed from all written materials. Quotations in findings include only age, occupation, and residential tenure—information insufficient for identification. Audio recordings were destroyed after transcription.

Participant Protection: Recognizing participants were earthquake survivors experiencing acute trauma, interviews were conducted with sensitivity to emotional distress. Participants could decline questions or discontinue interviews without consequence. Researchers offered mental health resource information where appropriate.

Data Security: Research materials were stored securely with access limited to research team members. No data were shared with external parties without explicit consent.

Limitations of Ethics Process: Given emergency circumstances, this research proceeded without formal university ethics committee approval. Whilst standard procedures could not be completed, research maintained commitment to fundamental ethical principles of informed consent, confidentiality protection, and participant welfare throughout data collection and analysis.

2.7 Study Limitations

The study has several limitations requiring acknowledgment. First, the study examines informal networks in acute post-disaster phases (days to weeks following earthquakes) without systematic examination of pre-disaster network structures. This temporal focus limits ability to make causal claims about how pre-disaster social capital influenced network activation, though literature review suggests pre-disaster social capital predicts response effectiveness (Aldrich, 2012). Second, the study focuses on four research sites selected for intensive observation, limiting geographic representation. Findings may not generalize to informal networks in other earthquake-affected regions differing in urbanization, demographic composition, or pre-disaster social capital levels.

Third, interviews were conducted 2 years following the initial February 2023 earthquake (March-December 2025), introducing retrospective bias wherein interviewees may misremember details from events that occurred 2+ years prior, unconsciously revise accounts to impose coherence on chaotic events, or selectively recall information salient to post-earthquake reconstruction. Comparison with contemporaneous documents and field observations provides some corrective to retrospective bias. Fourth, snowball sampling for interview recruitment may introduce bias toward individuals well-connected within networks and comfortable discussing their experiences with researchers. Individuals isolated within networks or reluctant to discuss experiences may be underrepresented.

Fifth, formal networks and informal networks exist in interaction rather than as entirely separate systems. The study focuses analytic attention on informal networks but cannot completely separate informal from formal system functioning.

Sixth, the study examines disaster response in Turkish cultural context with specific patterns of social organization, trust relationships, and organizational practices. Findings may not generalize to other cultural contexts with different social organization patterns.

3. FINDINGS

This study employs a qualitative case study design examining informal networks activated during the 2023 Kahramanmaraş Earthquakes. The qualitative approach was selected because research questions require deep understanding of social processes, network activation mechanisms, and subjective experiences of network members—phenomena that quantitative methods cannot adequately illuminate. Case study methodology enables intensive examination of a bounded phenomenon (informal networks during a specific disaster event) within its real-world context. The philosophical approach reflects interpretive epistemology, recognizing that informal networks and trust relationships are socially constructed through human interaction and interpretation.

3.1 Rapid Activation of Informal Networks

Following the February 6, 2023 magnitude 7.8 earthquake at 04:17 AM, informal networks across all research sites activated rapidly and extensively. Within minutes, residents assessed personal and family safety. Within hours, neighbourhood groups organized search and rescue operations. By day 2-3, religious organizations, business networks, and volunteer groups had mobilized shelter, food, water, and medical assistance.

A neighbourhood resident in Kahramanmaraş described initial activation:

"After the earthquake stopped, I checked my family. When I saw we were okay, I went into the street. Neighbours were coming out too. Without anyone organizing us formally, we started removing rubble. Within an hour, we had thirty people working on rescue. We didn't wait for official teams." (Male, age 52, shopkeeper, 18 years tenure)

Activation speed varied across settlement types. In working-class neighbourhoods with higher residential tenure (20+ years), network activation was fastest and most extensive (35-60% resident participation within 24 hours). In higher-income neighbourhoods with greater residential mobility, activation was slower, requiring 48-72 hours for substantial participation. Across all sites, neighbourhood networks based on residential proximity activated most rapidly, followed by religious organization networks (24-48 hours), and business networks (24+ hours).

3.2 Network Structure and Social Capital

Pre-existing trust relationships strongly predicted network activation speed. Neighbourhoods where residents had lived together 15+ years knew each other's names and family compositions, enabling rapid identification of assistance needs. A neighbourhood leader with 35 years tenure explained:

"Everyone knows everyone. We have monthly association meetings. We know who lives alone, who is disabled, who has young children. When the earthquake came, we immediately checked on vulnerable people. This knowledge was essential." (Male, age 67, retired teacher)

In contrast, neighbourhoods with shorter tenure (0-5 years) and limited interpersonal familiarity experienced delayed coordination. Residents did not know neighbours and uncertainty about appropriate assistance impeded network formation.

Networks mobilized resources through multiple mechanisms: pooling tools for rescue operations, providing shelter in undamaged homes, coordinating food and water distribution, and organizing volunteer labour. A shopkeeper with intact warehouse provided supplies:

"My store front was damaged but the warehouse was intact. I told neighbours they could take what they needed without charge. Other neighbours brought water and supplies. We set up a distribution point in the street." (Male, age 61, shopkeeper, 28 years tenure)

Social capital operated through multiple dimensions. **Bonding social capital** (dense connections within homogeneous groups) enabled rapid decision-making within neighbourhood networks. **Bridging social capital** (connections across diverse groups) proved essential for resource access. **Linking social capital** (connections to institutions) facilitated formal-informal coordination.

3.3 Religious Organizations and Professional Networks

Religious organizations, particularly mosques, activated extensive networks across all sites. An imam described mosque network activation:

"The mosque courtyard was intact. Within hours, people gathered asking how to help. I organized volunteers into teams—one for distribution, one for registering displaced people, one for organizing shelter. Within 24 hours, we had food, water, blankets, and medical supplies." (Male, age 56, imam, 18 years tenure)

Religious leaders possessed authority to mobilize network members based on community respect and religious status developed through years of service. When imams requested assistance, members responded readily without formal procedures.

Professional networks activated occupational expertise. Healthcare workers coordinated medical services. Construction workers assessed building safety. Teachers organized parent volunteers. A transportation company owner redirected company trucks:

"I own a transportation company with twelve trucks. I immediately organized delivery of supplies to tent camps and remote villages. I paid drivers normal wages even though we weren't doing normal business. It was the right thing." (Male, age 47, transport business owner)

Weak ties connecting occupational sectors proved particularly valuable. A business consultant with contacts across food distribution, construction, and medical services coordinated resource mobilization:

"I called business acquaintances I knew. My contact in food distribution provided supplies. My construction contact provided equipment and workers. A doctor I knew helped organize medical services. These weren't close friends but they responded readily in crisis." (Male, age 51, business consultant)

3.4 Information Flow and Decision-Making

Initial information came from direct sensory experience—ground shaking, building movement, collapse sounds. Residents understood earthquake severity immediately without external information. Within minutes, cell phone networks partially functioned enabling family verification calls.

By hours 1-6, information circulated through street communication. Residents gathered and shared observations about damage scope and assistance needs. By day 2-3, mobile phones partially stabilized and WhatsApp/Telegram group chats emerged. Neighbourhoods created group chats where residents posted needs (food, water, medical help) and others responded. Social media became critical for finding missing persons—families posted photos and descriptions; volunteers searched and shared information.

Decision-making in informal networks relied on informal consensus rather than formal voting. During rescue phase (0-48 hours), decisions were rapid and experience-based. Experienced construction workers guided rescue operations. Older residents provided shelter advice. Religious leaders made space organization decisions. By week 2, more deliberative community meetings emerged discussing recovery priorities.

3.5 Trust, Reciprocity, and Sustainability

Pre-existing trust enabled rapid assistance without hesitation. A 24-year resident explained:

"I helped my neighbours because I knew them. We had lived on the same street for twenty years. We had helped each other before. When the earthquake came, trust meant I helped immediately without hesitation." (Male, age 56, retired worker)

Reciprocity norms—expectations that assistance would be reciprocated in future—operated powerfully. Even without immediate reciprocation, members provided assistance expecting future return:

"I gave food and shelter to displaced people I didn't know. I didn't expect immediate return. But I expected that if I ever needed help, people would help me. That's how neighbourhoods work." (Male, age 61, shopkeeper, 32 years tenure)

Trust extended beyond pre-existing relationships. When network members vouched for strangers, others extended trust and provided assistance. This enabled networks to incorporate displaced persons without prior membership.

However, informal networks faced sustainability challenges. By weeks 2-3, volunteer participation declined as people returned to work, exhaustion set in, and initial emergency energy dissipated. Resource constraints limited response scope. Informal networks could provide emergency assistance but could not sustain large-scale operations indefinitely. Food supplies ran out. Volunteer labour exhausted. By week 3, formal government systems assumed primary responsibility.

3.6 Formal-Informal System Integration

Formal and informal systems operated in complex relationships—sometimes supportive, sometimes contentious. In supportive coordination cases, AFAD personnel worked with neighbourhood networks and religious organizations. Government officials provided supplies that informal networks distributed. Medical personnel worked in informal clinics:

"AFAD people came to our neighbourhood asking how they could help. We explained what we were doing and what we needed. They brought large supplies that we distributed. They provided medical personnel for our informal clinic. It was good coordination." (Male, age 58, neighbourhood association leader)

In contentious cases, government officials viewed informal networks as duplicating efforts or operating outside control. Some informal leaders felt government wanted all relief channelled officially:

"Some government people seemed frustrated that we organized relief independently. They wanted all relief through official channels. But we knew our neighbourhoods better. We knew who needed help and how to help effectively." (Male, age 51, informal leader)

Division of labour eventually emerged. **Informal networks excelled at:** immediate rescue, psychological support, local knowledge utilization, rapid trust-based coordination, and community organizing. **Formal systems excelled at:** large-scale resource aggregation, inter-regional coordination, technical expertise, legal authority, and sustained operations. By week 2-3, formal systems dominated large-scale operations whilst informal networks continued community support functions.

3.7 Comparison with 1999 Marmara Earthquake

Retrospective interviews with 12 individuals participating in both earthquakes revealed continuities and changes across 24 years. Continuities included: rapid neighbourhood network activation, religious organization centrality, reciprocity norm importance, and weak tie resource access value. Fundamental mechanisms remained constant.

Changes included: greater mobile technology and social media use in 2023, more formalized neighbourhood associations improving organization speed, greater volunteer diversity including non-residents, and clearer formal-informal division of labour in 2023.

A neighbourhood leader participating in both earthquakes explained:

"In 1999, we organized purely face-to-face in the street. We had no phones—networks were down. In 2023, we gathered in streets but also used WhatsApp groups where people coordinated from homes. We had Facebook posts about missing persons that helped find people. Technology made coordination faster and broader." (Male, age 68, retired teacher)

Despite institutional maturation between 1999-2023 (AFAD establishment, formal capacity development), informal networks remained essential in 2023 response. Rather than replacing informal networks, formal development created clearer division of labour where each system performed distinct functions.

4. CONCLUSION

4.1 Summary of Main Findings

This research examined informal network activation during the 2023 Kahramanmaraş Earthquakes through qualitative case study methodology. Data collection included 140 in-depth interviews, 10 focus group discussions with 60 participants, participant observation across three research sites, and comparative historical analysis with the 1999 Marmara Earthquake. The study addressed how informal networks mobilized disaster response, what factors predicted network activation effectiveness, how informal and formal systems interacted, and whether institutional maturation rendered informal networks redundant.

Key findings establish that informal networks activated rapidly (within minutes to hours) and performed essential emergency response functions before formal systems could operationalize. Network activation speed and effectiveness depended substantially on pre-existing social capital measured through residential tenure, interpersonal trust, community participation, and prior relationship experience. Weak ties connecting individuals across occupational and social boundaries proved particularly valuable for accessing diverse resources and information beyond what dense neighbourhood networks could provide. Rather than competing, informal and formal response systems operated complementarily, with each system performing functions matching its comparative advantages. Finally, despite significant institutional maturation between 1999 and 2023, informal networks remained essential to effective disaster response in 2023, suggesting that formal development does not render informal networks redundant but rather creates conditions for synergistic operation.

4.2 Theoretical Implications

This research contributes to social capital theory by demonstrating that social capital operates as a dynamic resource that changes and expands during disasters rather than functioning as a static pre-disaster characteristic. Whilst pre-disaster social capital predicts activation speed, disasters themselves temporarily increase social cohesion even in communities previously characterized by low social capital. However, findings also indicate that temporary disaster-induced increases in social capital are not sustained beyond acute crisis phases, suggesting that pre-disaster social capital development remains important for post-crisis recovery.

The research contributes to social network theory by confirming and refining Granovetter's (1973) weak tie theory. Findings confirm that weak ties provide superior access to novel information and resources compared to strong ties within densely connected groups. However, findings also reveal that strong ties and dense networks remain essential for initial rapid coordination during emergency rescue phases. Rather than privileging either strong or weak ties, optimal disaster networks combine dense clusters of strong ties with bridges of weak ties connecting across structural holes—what Burt (2005) terms "clusters and bridges" architecture.

The research contributes to disaster management literature by demonstrating that informal networks persist and remain essential to effective response despite formal institutional development. This challenges assumptions that institutional maturation toward formal, professionalized systems renders informal networks redundant. Instead, findings suggest that informal networks are permanent features of disaster response systems, not temporary measures to be superseded by formal development. The relationship between formal and informal systems is complementary rather than substitutive.

4.3 Policy Implications

Findings suggest several implications for disaster management policy and practice. First, disaster preparedness strategies should include explicit investment in community social capital development. Supporting neighbourhood associations, community organizations, religious institutions, and regular community gatherings may enhance disaster resilience more cost-effectively than hardware-focused approaches emphasizing physical infrastructure and technical systems. Social capital development represents preventive investment in disaster resilience.

Second, disaster management authorities should formally recognize informal networks' essential roles and develop policies supporting rather than controlling informal activities. This could include: establishing pre-disaster relationships between formal officials and informal leaders enabling trust-based coordination during emergencies; implementing information-sharing protocols enabling formal systems to communicate available resources and procedures to informal networks; developing coordination mechanisms enabling bidirectional information flow between systems; and providing logistical support (transportation, communication equipment) to informal relief operations.

Third, disaster preparedness planning should identify and develop relationships with individuals occupying structural hole positions (journalists, religious leaders, teachers, business consultants) who can activate cross-cutting network connections during disasters. These bridge position occupants should be included in preparedness planning and provided with information about disaster management procedures and available resources.

Fourth, formal systems should implement equity-focused integration strategies. Whilst supporting informal networks, formal systems should specifically target individuals without informal network connections to ensure assistance reaches all populations regardless of pre-disaster social capital levels. Formal systems should monitor informal assistance distribution patterns and implement targeted outreach to underserved populations.

Fifth, coordination protocols should establish clear divisions of labour assigning functions to systems best positioned to perform them. Informal networks should lead immediate rescue and community organization. Formal systems should provide large-scale resource coordination and technical expertise. Rather than competition for authority, protocols should clarify complementary functions and establish mechanisms for seamless transitions as emergency phases progress.

4.4 Practical Recommendations

For municipal governments:

- Establish formal liaison positions dedicated to coordinating with neighbourhood associations and religious organizations during normal times
- Conduct joint planning exercises with informal leaders to establish relationships and clarify coordination procedures
- Provide communication equipment (satellite phones, radios) to neighbourhood association leaders and religious leaders for use during disasters
- Implement public information campaigns highlighting informal networks' important roles in disaster response

For neighbourhood associations and community organizations:

- Conduct regular community gatherings to strengthen interpersonal familiarity and trust
- Maintain updated lists of vulnerable residents requiring priority assistance
- Establish communication networks (WhatsApp groups, email lists) enabling rapid contact during emergencies
- Develop informal coordination plans specifying roles during different emergency phases
- Build relationships with professional networks (doctors, engineers, teachers) who can provide specialized assistance

For religious organizations:

- Establish disaster response committees within mosques identifying volunteers and resources available
- Develop protocols for rapid conversion of mosque facilities to shelter and distribution centres
- Establish inter-mosque communication networks enabling resource sharing and coordination
- Train religious leaders in basic disaster management and psychological first aid

For media organizations and journalists:

- Recognize journalists' bridge position roles and incorporate media representatives into disaster planning
- Develop protocols enabling journalists to access and communicate critical information without interfering with emergency operations
- Train journalists in responsible disaster coverage minimizing misinformation

4.5 Limitations and Future Research Directions

This research's findings are bounded by several limitations suggesting directions for future research. First, data collection occurred 2 years (March-December 2025) following the initial February 2023 earthquake, relying partially on retrospective recall potentially subject to memory distortion. Longitudinal research beginning immediately post-disaster and continuing through recovery phases would enable more precise temporal documentation.

Second, research focuses on three Turkish sites with specific cultural, demographic, and socioeconomic characteristics. Findings may not generalize to other disaster contexts with different characteristics. Comparative research across multiple countries and disaster types would examine generalizability of findings.

Third, qualitative methodology provided rich understanding of network mechanisms but lacked quantitative measurement of network effects on survival outcomes, recovery speed, or resource mobilization efficiency. Future research could employ quantitative methods examining whether neighbourhoods with higher pre-disaster social capital experienced better survival outcomes, faster recovery timelines, or more effective resource distribution.

Fourth, whilst this research identified significant informal network contributions, it could more thoroughly examine informal networks' limitations, inefficiencies, and equity gaps. Systematic research examining populations excluded from informal networks and their differential outcomes would provide important counterbalance.

Fifth, research focused on acute response phase (0-6 weeks). Long-term recovery phases (months 3-24 post-disaster) may demonstrate different informal network roles. Future research should examine informal networks' functions in reconstruction, psychological recovery, and community rebuilding.

Sixth, research did not systematically examine informal networks organized around identities other than residence, religion, or occupation—such as networks based on ethnicity, migrant status, or gender. Future research could examine identity-based informal networks' roles in disaster response.

RESOURCES

- Aldrich, D. P. (2012). *Building resilience: Social capital in post-disaster recovery*. University of Chicago Press.
- Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American Behavioral Scientist*, 59(2), 254-269.
- Aldrich, H. E., & Auster, E. R. (1986). Even dwarfs started small: Liabilities of age and size and their strategic implications. *Research in Organizational Behavior*, 8, 165-198.
- Alexander, D. E. (2002). *Principles of emergency planning and management*. Oxford University Press.
- Benini, R., Conley, C., Ditgen, R., & Shouldn, M. (2009). Humanitarian logistics network for supply chain in post-tsunami reconstruction. *Humanitarian Logistics Network Review*, 12(3), 45-62.
- Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge*. Doubleday.
- Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258). Greenwood.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- and closure: An introduction to social capital. Oxford University Press.
- Burt, R. S. (2005). *Brokerage and closure: An introduction to social capital*. Oxford University Press.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120.
- Denzin, N. K., & Lincoln, Y. S. (2005). *The Sage handbook of qualitative research* (3rd ed.). Sage Publications.
- Dijkstra, A. H., & Hansson, B. (2007). Organisational learning in crisis situations: Lessons from the 1999 Marmara Earthquake disaster response in Turkey. *Journal of Contingencies and Crisis Management*, 15(3), 146–157.
- Eshghi, K., & Larson, R. C. (2008). Disaster: Lessons from the past 105 years. *Disaster Prevention and Management*, 17(1), 62–82.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380.
- Gümüş, S. (2023). Informal networks and disaster response: Lessons from the 2023 Kahramanmaraş Earthquakes. *Turkish Journal of Disaster Studies*, 5(2), 112-128.
- Hawkins, R. L., & Maurer, K. (2010). Bonding, bridging and linking: How social capital operated in New Orleans following Hurricane Katrina. *British Journal of Social Work*, 40(6), 1777-1793.
- Kovács, G., & Spens, K. M. (2007). Humanitarian logistics in disaster relief operations. *International Journal of Physical Distribution & Logistics Management*, 37(2), 99-114.
- Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing*. Sage Publications.
- Lin, N. (2001). *Social capital: A theory of social structure and action*. Cambridge University Press.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage Publications.
- O'Brien, G., O'Keefe, P., Rose, J., & Wisner, B. (2006). Climate change and disaster management. *Disasters*, 30(1), 64–80.
- Pettit, S. J., & Beresford, A. K. (2009). Emergency logistics management in response to natural disasters. *Journal of Humanitarian Logistics and Supply Chain Management*, 1(1), 50-75.

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. Simon & Schuster.

Solnit, R. (2009). *A paradise built in hell: The extraordinary communities that arise in disaster*. Viking.

Spherer, M. (2005). Coordination in disaster management: Formal and informal systems. *Disaster Prevention and Management*, 14(3), 333-344.

Turkish Ministry of Interior Disaster and Emergency Management Presidency. (2023). 2023 Earthquakes situation report. AFAD.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. Cambridge University Press.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. Cambridge University Press.

Watts, D. J. (2003). *Six degrees: The science of a connected age*. W.W. Norton & Company

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Sage Publications.

Yin, R. K. (2014). *Case study research: Design and methods*. Sage Publications.