



A Network Perspective on Interpersonal Trust Dynamics

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Introduction

Trust is an important and sensitive aspect of workplace relationships. A commonly accepted definition of trust at the interpersonal level is “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor

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or control that other party” (Mayer et al., 1995, p. 712). In the workplace, trust between employees has been associated with enhanced psychological safety, effective communication, and individual and organizational performance (Dirks & Ferrin, 2001; Fulmer & Gelfand, 2012; Zaheer et al., 1998). Hence, scholars have devoted considerable attention to exploring the antecedents of trust, among which network-related antecedents have received increasing attention over the past two decades. Researchers have investigated associations between trust and network variables such as reciprocity (Schoorman et al., 2007), the presence of third parties (Ferrin et al., 2006; Lau & Liden, 2008), or aspects such as the ego-centric network (Chua et al., 2008; Wong & Boh, 2010), and the whole network (Gupta et al., 2016). This body of research, while laying the foundations for future research on trust from a network perspective, is still in an early stage. In synthesizing the literature, we observe that extant research on this topic remains largely fragmented and inconclusive.

Because trust is embedded in interpersonal networks, there is good reason to assume that trust changes along with network relations and structures (Baer et al., 2018; Giest, 2019). Yet, given the scattered scholarly landscape on trust-network associations, advancements can be made by integrating previous research and providing guidelines that may assist in exploring how networks affect trust from a dynamic perspective. Therefore, we conduct a systematic literature review to integrate the literature and answer the research question: *How does network embeddedness affect trust dynamics?* In line with previous research (Chua et al., 2008; De Cremer et al., 2018), we define *trust dynamics* as a system of changes in interpersonal trust relationships. This system of changes includes the three stages of trust, formation, decay, and repair (Bachmann et al., 2015), and it pairs well with the voluntary and vulnerable relational notion that underlies the trust dynamics (Mayer et al., 1995, p. 712).

To explicate trust dynamics, this chapter focuses on two network mechanisms: *relational embeddedness* that describes the quality of a tie between trustor and (potential) trustee and *structural embeddedness* that captures the patterns and configurations of ties surrounding this relationship (Gulati, 1998). We organize the literature by identifying relational and structural dimensions of networks that affect trust in the stages of

trust formation, decay, and repair and provide implications for practice based on the research.

Key Concepts

Network Embeddedness

The concept of embeddedness was introduced in sociology to investigate the interdependence between social structure and behavior (Coleman, 1958). Granovetter (1985) further developed this concept and distinguished between embeddedness as “concrete personal relations and structures (or “networks”) of such relations” (Granovetter, 1985, p. 490). Following Granovetter’s seminal work, Nahapiet and Ghoshal (1998) further distinguished between relational embeddedness and structural embeddedness. *Relational embeddedness* refers to “the kind of personal relationships people have developed with each other through a history of interactions” (Nahapiet & Ghoshal, 1998, p. 244). *Structural embeddedness*, in turn, refers to the configurations of the relationships. Both relational and structural embeddedness are characterized by a broad set of dimensions, and this literature review aims to investigate which of them are relevant in explaining trust dynamics in an intra-organizational context.

Trust Dynamics

In some prior studies embedded in the field of general management, trust dynamics are understood as behavioral or psychological changes (Lewicki et al., 2006). This view, however, would limit trust dynamics to isolated individuals. Such a view has become conceptually problematic as more recently, network researchers found that trust levels change over time in a network, depending on the presence of other actors (Jones & Shah, 2016; Kim & Song, 2011; Wittek, 2001). As an active notion, trust changes following a trajectory of “formation, dissolution, and restoration” (Korsgaard et al., 2018, p. 142). Accordingly, this chapter focuses

on trust as a dynamic process of trust formation, decay, and repair (Bachmann et al., 2015). *Trust formation* is a process in which a trust relationship is built between two individuals. Formed trust relationships are not always stable as trust is fragile and easily broken. As a result, trust violations occur frequently in a workplace and may lead to serious consequences, such as revenge (Aquino et al., 2001), distrust (Bijlsma-Frankema et al., 2015), and damaged trust (Schweitzer et al., 2006). These phenomena are representative of *trust decay*, referring to a process in which an existing trust relationship disappears, or wherein the level of trust in the relationship declines following the occurrence of trust violations (Dirks et al., 2009). A lack of trust—or broken trust—challenges the functioning of organizations. Researchers thus show an increasing interest in trust repair. *Trust repair* refers to the process of rebuilding or restoring a trust relationship that has been broken due to a trust violation, back to the previous state, or an even more positive state (Gillespie & Dietz, 2009; Kim et al., 2009; Ren & Gray, 2009).

Methodology

To answer the research question, we conducted a systematic literature search in the Web of Science Core Collection to ensure a high-quality sample of peer-reviewed articles. Based on a systematic-screening and selection process,¹ we finally identified 31 articles (see Table 1 for an overview of the included articles).

¹ We used keywords from the trust literature (“trust dynamics” or “trust building” or “trust formation” or “trust decay” or “trust decline” or “trust repair” or “trust restoration” or “trust violation” or “trust process” or “trust” or “trustworthiness”) and the social networks literature (“social network analysis” or “network embeddedness” or “social networks” or “network position” or “structural holes” or “brokerage” or “centrality” or “tie strength” or “third party”). We used three selection criteria: journal impact factor no less than 2 in 2018, interpersonal level, and quantitative studies.

Table 1 Trust as a consequence of network embeddedness

Network embeddedness dimension	Trust formation as a consequence of network embeddedness				
	Author	Journal	Data	Setting	Findings
Tie content	Olk and Elvira (2001)	Group & Organization Management	Experiment	208 MBA students in the US	Friends have higher levels of trust than nonacquaintances in negotiation
Tie content	Methot et al. (2016)	Personnel Psychology	Two cross-sectional network surveys	168 insurance company employees and 182 restaurant and retail sales employees in the US	Multiplexity of friendship and instrumental ties is positively related to coworker trust
Tie content	Bianchi et al. (2018)	Social Networks	Qualitative research and a cross-sectional network study	29 independent professionals in a shared working space in Italy	Collaboration relations predict trust relations directly
Tie content Tie strength	Levin and Cross (2004)	Management Science	Longitudinal survey	127 respondents from three companies in the US, the UK, and Canada	Advice-seeking tie strength is highly correlated with trust, regarding the dimension of competence and benevolence

(continued)

Table 1 (continued)

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Tie strength	Karlan et al. (2009)	Quarterly Journal of Economics	Cross-sectional network survey	299 households in two low-income shantytowns in Peru	Strong ties are related to trust formation; Dense networks improve valuable assets transaction through bonding social capital and trust
Tie strength	Levin et al. (2011)	Organization Science	Longitudinal survey	129 executive MBA students in the US and Canada	Reconnecting dormant strong ties produces higher trust than reconnecting weak ties

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Tie strength Density	Jonczyk et al. (2016)	Academy of Management Journal	Longitudinal network survey	68 (67) service professionals from three companies in Europe and North America	Tie longevity and frequency are positive predictors of emotional trust building in the process of new tie gaining; Dense network limits the new trust relationship building More interactions induce trust development
Tie strength	Barrera (2007)	Social Networks	Experiment	144 undergraduate students	

(continued)

Table 1 (continued)

Trust formation as a consequence of network embeddedness		Setting	Findings
Network embeddedness dimension	Author	Journal	Data
Tie strength Reciprocity Third parties	Barrera and van de Bunt (2009)	European Sociological Review	Longitudinal network survey
			Around 40 respondents in a dialysis department of a Dutch hospital
			Past trust relationship improves current trust relationship; Reciprocity contributes to trust formation; Information ego acquired from third parties about alters will influence how ego trusts alter

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Tie strength Third parties	Buskens et al. (2010)	Social Networks	Experiment	72 undergraduate students	Previous interaction experiences predict further trust development in the experiment; Sanctioning opportunities due to the existence of third parties affect the trustworthiness of trustees
Tie strength	Van Miltenburg et al. (2012)	Social Networks	Experiment	138 students in the Netherlands	Previous interaction experiences predict further trust development

(continued)

Table 1 (continued)

Trust formation as a consequence of network embeddedness		Setting	Findings
Network embeddedness dimension	Author	Journal	Data
Reciprocity Transitivity	Robins and Pattison (2001)	Journal of Mathematical Sociology	Longitudinal network survey
			14 participants in a temporary training group in Australia
			Reciprocity contributes to trust formation; Transitive triads in trust network are very stable once formed, and new transitive triads are most likely to emerge from two individuals who both trust the same people (common third parties)
Reciprocity	Lusher et al. (2012)	Social Networks	Cross-sectional network survey
			47 top managers in an international multi-unit industrial group in Italy
			Expressed trust does not show a significant effect of reciprocity

Network embeddedness dimension		Trust formation as a consequence of network embeddedness			
	Author	Journal	Data	Setting	Findings
Similarity	Comulada et al. (2012)	Social Networks	Longitudinal network survey	A drug-using community in the US	Trust and drug use similarity are not consistently correlated
Similarity	Mäkelä et al. (2012)	International Business Review	Cross-sectional network survey	326 inter-personal cross-border relationships in MNC firms in Finland	Interpersonal similarities regarding culture and functional similarities do not affect trust significantly

(continued)

Table 1 (continued)

Trust formation as a consequence of network embeddedness		Setting	Findings
Network embeddedness dimension	Author	Journal	Data
Structural equivalence Third parties	Wittek (2001)	Journal of Mathematical Sociology	Longitudinal network survey
			25 salesmen in the furniture department of a North American retail sales store
			Structural equivalence between two actors does not predict trust formation between them over time; Trustor tends to maintain trust relationship to trustee who occupies a third-party intermediary position providing updated information concerning others' trustworthiness; Ego tends to trust alters who are trusted by other alters who occupy a similar position as ego

Trust formation as a consequence of network embeddedness		Journal	Data	Setting	Findings
Network embeddedness dimension					
Structural equivalence	Sparrowe and Liden (2005)	Administrative Science Quarterly	Longitudinal network survey	Around 200 respondents in a manufacturing firm and around 30 respondents in a telecommunications organization	In a trust network, structural equivalence between employee and leader increases the possibility that the employee is seen as trustworthy and reliable

(continued)

Table 1 (continued)

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Structural equivalence Transitivity Density	Ferrin et al. (2006)	Journal of Applied Psychology	Cross-sectional network survey	68 employees in a medium-sized work organization in the US	Structural equivalence between trustor and trustee is significantly related to trust relationship between them; Trust can be transferred through common trusted third parties and thus contribute to new trust relationship formation; Network closure improves trust formation

Network embeddedness dimension		Trust formation as a consequence of network embeddedness			
	Author	Journal	Data	Setting	Findings
Transitivity	Lau and Liden (2008)	Journal of Applied Psychology	Cross-sectional network survey	146 members of four diverse organizations in the US	Coworkers tend to place more trust in fellow coworkers who are trusted by the leader Transitivity is significant in trust network
Transitivity	Robins et al. (2009)	Social Networks	Cross-sectional network survey	A training group of 23 new recruits	Advocates' network density, non-overlapping contacts, and heterogeneity, improve central manager's trustworthiness reputation
Third parties	Wong and Boh (2010)	Academy of Management Journal	Cross-sectional network survey	157 senior managers from a large emergency response firm	

(continued)

Table 1 (continued)

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Third parties	Kvaløy and Luzuriaga (2014)	Experimental Economics	Experiment	180 students from the University of Stavanger, Norway	With the involvement of third parties and delegation behaviors, the reciprocity behaviors from trustee to trustor decrease
Third parties	Frey et al. (2019)	Social Networks	Experiment	342 students at Utrecht University	Network embeddedness with third parties increases trustfulness and trustworthiness

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Third parties	Gérxhani et al. (2013)	Social Networks	Experiment	234 participants, mainly undergraduate students at the University of Amsterdam	Information sharing from third-party affects trust judgment of employers in candidates
Centrality	Sarker et al. (2011)	Journal of Management Information Systems	Cross-sectional network survey	111 globally distributed student teams in the US, Denmark, and Norway	Communication degree centrality is related to trust centrality
Centrality	Tsai and Ghoshal (1998)	Academy of Management Journal	Cross-sectional survey	15 business units in a multinational electronics company	Betweenness centrality of an actor in a social interaction network affects the level of the actor's perceived trustworthiness

(continued)

Table 1 (continued)

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Density	Gargiulo and Benassi (2000)	Organization Science	Cross-sectional network survey	19 managers in a single organizational unit in Italy	Network closure provides a good environment for trust development, but limits flexibility to build new relationships required by a new task
Density	Burt and Burzyska (2017)	Management and Organization Review	Retrospective network study through interviews	Around 700 entrepreneurs' networks in China	Network density improves trust also in the Chinese context
Network embeddedness dimension	<i>Trust decay as consequences of network embeddedness</i>				

Trust formation as a consequence of network embeddedness					
Network embeddedness dimension	Author	Journal	Data	Setting	Findings
Third parties	Lee and Chuang (2018)	Business Ethics-a European Review	Experiment	137 business school students in Taiwan	Trustor and trustee are possible to collude to make benefits for themselves by sacrificing third party's benefits
Social relations	Yenkey (2018)	Administrative Science Quarterly	Longitudinal archival data	Database from Kenya's ethnically diverse Nairobi Securities Exchange	Social relations between victim and perpetrator affect the formation and diffusion of distrust
Network embeddedness dimension	<i>Trust repair as consequences of network embeddedness</i>				(continued)

Table 1 (continued)

Network embeddedness dimension		Trust formation as a consequence of network embeddedness			
	Author	Journal	Data	Setting	Findings
Third parties	Yu et al. (2017)	Journal of Business Research	Experiment	84 employees from an outward liaison department through WeChat in China	Third parties influence victims' willingness to reconcile and thus continuity intention

Results

Table 2 provides an overview of the major findings and suggestions for future research, indicating that network-trust dynamics shows a multi-dimensional characteristic and that more attention is called for the research on trust decay and repair. Figure 1 shows the conceptual framework.

Trust Formation

Relational Embeddedness and Trust Formation

In the extant trust literature, we identified four relational dimensions that affect trust formation: tie content, tie strength, reciprocity, and similarity.

Tie content refers to specific resource-based or identity-based content involved in a social tie (Podolny & Baron, 1997). Although tie content plays a role in explaining the outcomes related to a tie, limited research has been conducted to directly investigate the role of tie content in trust formation. In our review, four studies shed light on the effect of tie content on trust formation (Bianchi et al., 2018; Levin & Cross, 2004; Methot et al., 2016; Olk & Elvira, 2001). These studies show that the existence of friendship ties (Olk & Elvira, 2001) and collaboration ties (Bianchi et al., 2018) positively affect trust formation. Besides, Levin and Cross (2004) found that advice-seeking ties are also positively associated with seekers' trust in givers. Going beyond a single type of tie content, Methot et al. (2016) found that multiplexity, which refers to the overlap of instrumental and friendship ties in a workplace, is positively related to coworker trust because multiplexity produces a strong emotional bond between coworkers.

Tie strength refers to a combination of the duration, closeness, and interaction frequency of a tie (Baer, 2010). The literature (eight articles) provides consistent results regarding how tie strength affects trust formation. Researchers have found evidence that strong ties are not only related to higher trust (Karlan et al., 2009; Levin & Cross, 2004; Levin et al., 2011) but also predict higher trust over time (Jonczyk et al., 2016).

Table 2 Summary of major findings and future research

	Trust formation		Trust decay	Trust repair	Findings	Future research suggestions
	Longitudinal	Cross-sectional				
Relational embeddedness	Tie content (Levin & Cross, 2004)	(Bianchi et al., 2018; Method et al., 2016)	(Olk & Elvira, 2001)	×	Tie content affects trust formation	Other types of ties, such as negative and neutral ties; The effects of tie content on trust decay and trust repair; More longitudinal evidence
	Tie strength (Barrera & van de Bunt, 2009; Jonczyk et al., 2016; Levin & Cross, 2004; Levin et al., 2011)	(Karlán et al., 2009)	(Barrera, 2007; Buskens et al., 2010; Van Miltenburg et al., 2012)	×	Results are consistent that strong ties are related to higher trust	The effects of tie strength on trust decay and trust repair

Trust formation		Trust decay	Trust repair	Findings	Future research suggestions
Longitudinal	Cross-sectional	Experimental			
Reciprocity (Barrera & van de Bunt, 2009; Robins & Pattison, 2001)	(Lusher et al., 2012)	×	×	Reciprocity predicts trust formation over time but trust is not always reciprocal	The effect of reciprocity across networks; The effects of reciprocity on trust decay and trust repair
Similarity (Comulada et al., 2012)	(Mäkelä et al., 2012)	×	×	Similarities regarding culture and function are not related to trust formation; Difference regarding network positions affects trust formation	The effects of similarity on trust decay and trust repair; Tie formation or related interactions might work as a mediator between similarity and trust formation; Differences explain trust relationship changes

(continued)

Table 2 (continued)

		Trust formation		Trust decay		Trust repair		Findings		Future research suggestions
		Longitudinal	Cross-sectional	Experimental						
Structural embeddedness	Structural equivalence	(Sparrowe & Liden, 2005; Wittek, 2001)	(Ferrin et al., 2006)	×	×	×	×	Results are inconclusive	Studies using mixed methods are expected to explain the conflicts; The effects of structural equivalence on trust decay and trust repair	Hierarchy in relations needs attention; The effects of transitivity on trust decay and trust repair
	Transitivity	(Robins & Pattison, 2001)	(Ferrin et al., 2006; Lau & Liden, 2008; Robins et al., 2009)	×	×	×	×	Transitivity improves trust formation	Transitivity improves trust formation	Hierarchy in relations needs attention; The effects of transitivity on trust decay and trust repair
	Third parties	(Barrera & van de Bunt, 2009; Wittek, 2001)	(Wong & Boh, 2010)	(Buskens et al., 2010; Frey et al., 2019; Gërkhani et al., 2013; Kvaløy & Luzuriaga, 2014)	(Yenkey, 2018)	(Yu et al., 2017)		Third parties play both passive and proactive roles	Effects of third parties on trust decay and trust repair	Effects of third parties on trust decay and trust repair

Trust formation		Cross-sectional		Experimental		Trust decay	Trust repair	Findings	Future research suggestions
Longitudinal	sectional	Longitudinal	sectional	Experimental	Experimental				
Centrality	×	×	(Sarker et al., 2011; Tsai & Ghoshal, 1998)	×	×	×	×	Centrality improves trust formation	Closeness centrality; The effects of centrality on trust decay and trust repair; Seek longitudinal evidence
Density	(Jonczyk et al., 2016)	×	(Burt & Burzynska, 2017; Ferrin et al., 2006; Gargiulo & Benassi, 2000; Karlan et al., 2009)	×	×	×	×	Density improves trust formation within a network but impedes trust formation across network boundaries	Network boundaries are of importance; The effects of network centralization on trust dynamics

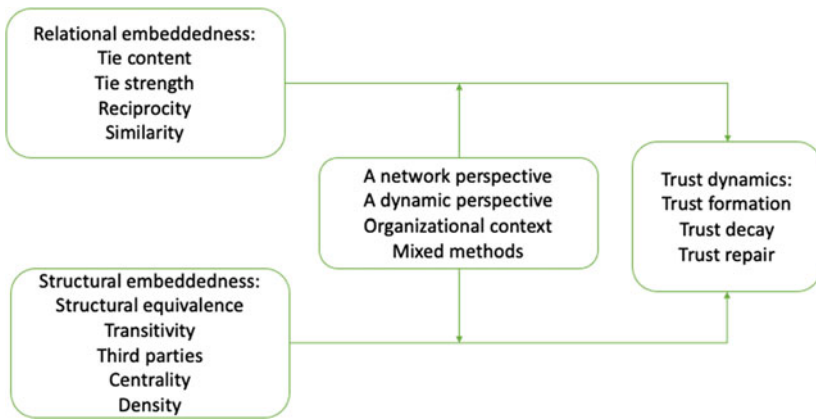


Fig. 1 Conceptual framework: Network embeddedness and trust dynamics

In addition, numbers of previous interactions, reflecting the strength of a tie, were found to affect trust formation positively (Barrera, 2007; Barrera & van de Bunt, 2009; Buskens et al., 2010; Van Miltenburg et al., 2012).

Reciprocity refers to the symmetry of a tie, i.e., the extent to which a tie from Actor A to Actor B is perceived as mutual also from the perspective of Actor B to Actor A (e.g., based on returning favors) (Borgatti et al., 2018). We discuss reciprocity separately instead of treating it as one of the dimensions of tie strength because an asymmetric tie, such as an advice-seeking tie, can also be strong. Reciprocity occurs within dyads, and it is argued to improve trust development through mutual recognition (Barrera & van de Bunt, 2009). However, we found inconsistent results from three studies in the review. On the one hand, in longitudinal studies researchers observed that reciprocity contributed to trust development over time (Barrera & van de Bunt, 2009; Robins & Pattison, 2001). On the other hand, in a cross-sectional study, Lusher et al. (2012) found that expressed trust relationships are not significantly reciprocated. Despite the inconclusive results, a clear distinction can be made: Although reciprocity predicts trust formation and persistence over time, at a given point in time, trust should not be assumed to be reciprocated.

Similarity is a relational concept, which is “operationally defined on such dimensions as age, sex, education, prestige, social class, tenure, and occupation” (Brass et al., 2004, p. 796). Similarity is commonly argued to predict tie formation, while the effect of similarity on trust formation has been less investigated. In our review, only two studies shed light on the relationship between similarity and trust formation (Comulada et al., 2012; Mäkelä et al., 2012). Researchers did not find consistent evidence that similarity, in terms of nationality (Mäkelä et al., 2012) or drug use (Comulada et al., 2012), is related to trust formation. We think that this lack of evidence may be caused because the studies failed to take mediators into account. Similarity predicts tie formation because similar people have more opportunities to interact with each other (Brass et al., 2004; Ertug et al., 2021; McPherson et al., 2001). Building on a formed tie, trust is then likely to develop. Therefore, we propose that similarity affects trust formation indirectly, through tie formation.

Structural Embeddedness and Trust Formation

We identified five structural dimensions that influence trust formation: structural equivalence, transitivity, third parties, centrality, and density.

Structural equivalence refers to the extent to which two actors are similar regarding their connections and disconnections with others in a network (Ferrin et al., 2006). Research findings (three studies) are inconclusive regarding the effect of structural equivalence on trust formation. On the one hand, structural equivalence between an individual and a third party has an effect on trust formation. When a trustor and a third party share a great number of connections, the trustor is more likely to develop trust in a trustee who is trusted by the third party (Witteck, 2001). Sparrowe and Liden (2005) found that when an employee and a leader occupy similar connections within an organization, the employee is likely seen as influential, trustworthy, and reliable by other colleagues. On the other hand, structural equivalence between a trustor and a trustee was found to have inconclusive effects on trust formation between the trustor and trustee. Research concerning the evolution of a trust network did not find evidence that structural equivalents tend to develop trust

in each other over time (Witteck, 2001). The situation appears different in a communication network in a cross-sectional dataset. Ferrin et al. (2006) found that structural equivalence in a communication network was significantly related to trust: When two employees have communication connections with the same set of actors, they tend to trust each other. Considering that different methods are used in these two studies, the inconclusive findings can be summarized as follows: Although structural equivalence (between the trustor and trustee) is positively related to trust, it may not lead to trust over time.

Transitivity refers to the tendency to build relationships with contacts' contacts (Burk et al., 2007; Mirc & Parker, 2020). It describes a triadic structure: If Actor A has a tie to Actor B, and Actor B has a tie to Actor C, then Actor A tends to build a tie with Actor C (Holland & Leinhardt, 1977; Louch, 2000). Four studies in the review found that transitivity leads to trust formation (Ferrin et al., 2006; Lau & Liden, 2008; Robins & Pattison, 2001; Robins et al., 2009). Researchers found that a tendency towards transitivity existed in trust networks (Ferrin et al., 2006; Robins et al., 2009). Robins and Pattison (2001) investigated transitivity in a trust network from a dynamic perspective and found that transitive triads were stable over time once they formed. Under specific conditions, nevertheless, transitivity presented special features. For instance, Lau and Liden (2008) studied transitivity in a leadership context and found that employees tended to place more trust in fellow coworkers who were trusted by the leader. The conclusion was supported even though the precondition that the employees should have high trust in the leader was not found. In this case, the influence of the leader improved trust formation while the structure of transitivity is incomplete. This study indicates that apart from the structural features of transitivity, contextual factors, such as hierarchy, are relevant when investigating transitivity and trust formation. In conclusion, these studies provide empirical evidence supporting the relationship between transitivity and trust formation.

Third Parties Apart from the focus on the trustor and the trustee, the role of third parties has received considerable attention in explaining trust formation (seven articles in this review). We discuss the role of third parties separately from structural equivalence and transitivity, because in

this section we focus on third parties who are not assuming a specific position of structural equivalence or transitivity. On the one hand, we found that third parties can play a passive role in influencing trust formation between a trustor and a trustee because both trustor and trustee make decisions considering a broader reference—the presence of third parties. For instance, when trustees have connections with third parties who have more information and resource advantages, trustors tend to maintain trust relationships with the trustees (Wittek, 2001). Besides, a third party's entire network affects the process. Wong and Boh (2010) found that the ego network characteristics of employees who act as advocates of managers influence these managers' reputation among peers. Results in a trust game also show that a trustee was less likely to reciprocate trust to a trustor when the trustor was delegated to play the game for a third party's benefits instead of their own benefits (Kvaløy & Luzuriaga, 2014). Moreover, the presence of third parties functions as a sanctioning mechanism that can improve trust formation by reducing opportunistic behaviors (Buskens et al., 2010; Frey et al., 2019). This research suggests that the presence of third parties affects the trust relationship between a trustor and a trustee and that the effects are conditional on different contexts. On the other hand, we found that third parties can play a proactive role in influencing trust formation, e.g., by conveying information between a trustor and a trustee, third parties can influence their judgments about each other (Barrera & van de Bunt, 2009; Gërkhani et al., 2013).

Centrality refers to the extent to which “an actor is central [or core] to a network” (Brass, 2003, p. 288). Centrality can be operationalized through various measures in social network analysis, such as degree centrality, closeness centrality, and betweenness centrality (Freeman, 1978), which highlight different patterns of “traffic flows” through a network (Borgatti, 2005). As one of the most frequently studied concepts, centrality is generally argued to be advantageous because it provides greater power and influence (Bruning et al., 2018; Ibarra, 1993). Despite the popularity and advantages of centrality in social network studies, trust formation relative to centrality has been relatively deprived of scholarly attention. Only two studies in the review shed light on the roles of degree centrality and betweenness centrality in trust

formation (Sarker et al., 2011; Tsai & Ghoshal, 1998). Degree centrality refers to “the number of direct connections that a given actor (or node) has with other actors” (Li et al., 2013, p. 1517). Betweenness centrality refers to “the proportion of the shortest paths between all pairs of nodes that pass-through a given actor in the network” (Li et al., 2013, p. 1517). Sarker et al. (2011) found that an actor’s degree centrality in a communication network was positively related to that actor’s direct trust ties with others because the higher degree of communication the actor engages in increases others’ perceptions on the actor’s trustworthiness. Similarly, Tsai and Ghoshal (1998) found that an actor’s betweenness centrality in a social interaction network improved trust formation. These two studies used cross-sectional data to test the correlation between centrality and trust but did not investigate whether centrality could predict trust formation over time. In addition, other centrality patterns, such as closeness centrality, have not been explored to explain trust formation.

Density refers to “the ratio of existing ties between team members relative to the maximum possible number of such ties” (Balkundi & Harrison, 2006, p. 50). Density is used to explain how the whole network affects trust formation among actors in a network because density is perhaps “the most common way to index network structure as a whole” (Balkundi & Harrison, 2006, p. 50). Many studies in the review investigated the connection between network density and trust formation. Researchers found consistent evidence that network density improved trust formation, e.g., in social communities (Karlan et al., 2009), in managers’ networks (Gargiulo & Benassi, 2000), in intra-organizational networks (Ferrin et al., 2006), and in different contexts of West and East (Burt & Burzynska, 2017). In spite of the consistency regarding the relationship between density and trust within a network, Jonczyk et al. (2016) came up with a different rationale. In their empirical work, they found that internal network density limited the new trust relationship building across network boundaries. Therefore, when investigating how density affects trust formation, it is also important to consider the network boundaries.

Trust Decay

Only limited attention has been paid to investigating trust decay from a network perspective, as outlined by the low count of occurrence of trust decay studies in Table 1. In the review, only two studies shed light on this topic (Lee & Chuang, 2018; Yenkey, 2018). After the occurrence of a trust violation, Yenkey (2018) found that the relations between the victim (trustor) and violator (trustee) affect the formation and diffusion of distrust. Specifically, when the victim and violator belonged to the same social group, the victim was less likely to attribute the blame to the group wherein they have the same identity. The study of Yenkey (2018) suggests that dyadic relational characteristics, such as ties strength and reciprocity, affect trust decay. Apart from dyadic factors, another study by Lee and Chuang (2018) indicates that third parties play a role in trust decay. Lee and Chuang (2018) considered the loss of benefits of a third party when they investigated immoral behaviors between a trustor and a trustee. They found that the trustor and the trustee could collude to generate benefits for themselves by sacrificing a third party's benefits. This implies the possibility that third parties may behave proactively in trust decay, with the purpose of protecting their own benefits.

Trust Repair

Trust repair has received much attention in research, although rarely from a social network perspective. In our review, only one study investigated how third parties contribute to trust repair (Yu et al., 2017). Yu et al. (2017) found in an experiment that persuasion and guarantees from third parties increased trustors' willingness to reconcile with trustees after the occurrence of violations. This study indicates that third parties are able to influence trust repair between the trustor and trustee. In general, considering that both trustor and trustee, as well as events of violations and repair actions are situated in a network (Kim et al., 2013), we argue that research on trust repair needs to be enriched by further investigations from a network perspective (Kähkönen et al., 2021).

Discussion and Conclusion

Responding to calls to investigate trust from a social network perspective (Gupta et al., 2016) and from a dynamic perspective (Fulmer & Gelfand, 2012), this chapter provides a systematic literature review to examine how intra-organizational network embeddedness influences interpersonal trust dynamics. We identified dimensions of network embeddedness as antecedents of trust dynamics, including four relational factors (tie content, tie strength, reciprocity, and similarity) and five structural factors (structural equivalence, transitivity, third parties, centrality, and density). We then analyzed the effects of network embeddedness on trust in each stage of trust formation, decay, and repair. We found that network embeddedness has diverse effects on trust dynamics. However, we also contend that, although the review spans a long period, this research question has not been clearly answered and significant gaps remain. We propose a research agenda to address this question.

Future Research Agenda

A Network Perspective

Trust is embedded in social relations, whose quality and configuration affect trustors' and trustees' judgments of and reactions to each other (Schilke et al., 2021). Previous research has justified this argument, and more is to be unpacked in future research to deepen our understanding of trust from a network perspective. First, apart from the network dimensions summarized above, space remains for future research to explore how other network dimensions affect trust dynamics. For instance, extant research shows that ego's degree centrality (Sarker et al., 2011) and betweenness centrality (Tsai & Ghoshal, 1998) increase the probability of being perceived as trustworthy, while the effect of closeness centrality remains unexplored. Closeness centrality refers to "the mean shortest distance by which a given actor is separated from all other nodes in a network" (Li et al., 2013, p. 1517). With the shortest distance to reach out to all others in an organization (Freeman, 1978), it remains

interesting to investigate whether closeness centrality improves the focal actor's trust relationships with others. Researchers need to be aware that a high closeness centrality means a high degree of exposure to multiple and diverse others, which might influence the stability of the focal actor's trust relationships with certain trustees. In addition, at a network level, we obtained insights into the effects of density on trust formation (Gargiulo & Benassi, 2000; Karlan et al., 2009), while it remains unclear whether centralization plays a role in trust development. Centralization refers to "the extent to which exchange relationships are concentrated among a few individuals" (Chung et al., 2011, p. 739). Different from density, which shows the degree of cohesion of a network, centralization additionally shows the distribution of the cohesion (Chung et al., 2011). The question of whether a centralized context improves or impedes trust development deserves further research. Individuals in a centralized network tend to develop a shared identity, which leads to trust development. However, centralization might indicate lower density and impede the formation of trust. Another question that prior research has left unexplored is how multiple network dimensions, which often co-exist, interact to affect trust dynamics (Chung et al., 2011). For instance, the effect of degree centrality on trust formation in a centralized context might differ from the effect in a decentralized context, as a decentralized structure may weaken the advantages of an individual's degree centrality.

Moreover, we suggest that a network perspective enriches the research on trust decay and repair. For instance, in a dyadic context, tie strength is a critical factor influencing trust decay. Considering that weak ties are built without strong emotional foundations, they may suffer more from trust violations, which thus more likely lead to trust decay. Nevertheless, strong ties may also lead to trust decay with a higher probability because (certain types of) trust violations can damage the trustor's identity and positive expectations regarding the strong relationship. Another topic that is interesting for future research is the role of third parties. Tying in with current developments in the network literature to move beyond dyadic and bilateral relationships as antecedents to trust, future work could explore third and further n-party effects on trust dynamics between individuals or groups (Dirks & de Jong, 2021; Gupta et al., 2016). For instance, building on the effect of direct reciprocity involving

two parties on trust, which is the mainstream of extant research, future research may also explore how indirect reciprocity involving third parties affects trust (Molm, 2010). This is a promising avenue to make a contribution because so far, these two topics are mainly investigated in a dyadic or individual context.

A Dynamic Perspective

Prior research investigated the connection between network embeddedness and trust (for a review, see Fulmer & Gelfand, 2012), while the dynamic perspective needs more attention. First, the relations between trust formation, decay, and repair can be explored to enrich our understanding of trust dynamics. To date, extant research has investigated the effects of network embeddedness on trust formation. Research on trust decay and repair could build on the extant research on trust formation under the condition that the connections between the three stages are clear. For instance, strong ties are found to predict trust formation (Jonczyk et al., 2016; Levin et al., 2011), but it remains unexplored how strong ties affect trust decay or repair. Tie strength between the trustor and trustee may lead to different levels of tolerance towards and expectations of each other; as a result, they may display varying attitudes and behaviors responding to trust decay and trust repair. Providing that the connections between trust formation, decay, and repair are made clear, researchers can investigate the effects of tie strength on trust decay and repair based on extant research on trust formation.

Second, we suggest focusing on the difference/alignment between trustfulness and trustworthiness in a trust relationship (Fulmer & Gelfand, 2012). As Bachmann et al. (2015) suggest the trustor and the trustee play different roles in a trust relationship and both influence trust development. For instance, Jones and Shah (2016) found that the trustor and the trustee influence trust formation differently in that the trustor's influence decreases while trustee's influence increases over time. When the trustor's level of trustfulness does not correspond to the level of the trustee's trustworthiness, this trust relationship is unbalanced and may change. The alignment and mis-alignment may also explain

the dynamics of trust. Additionally, trust is not divorced from environmental uncertainty and potential risks involved because trusting means that trustors are willing to take risks in an uncertain environment. Environmental factors, such as uncertainty, change over time and affect trust dynamics accordingly. Cheshire et al. (2010) have found that shifting between high and low uncertain environments and high and low cooperative situations affect the level of trust of interactive parties. Their work inspires future research to shed light on the dynamics of the environment and social networks, which affect the dynamics of trust. A network perspective and a dynamic perspective should not be treated as separate angles; instead, the combination and integration of both are likely to make a difference in future research.

Organizational Context

Different organizational contexts also account for inconclusive findings in extant research and are a factor that needs to be considered. First, to better understand the complex process of trust dynamics, it helps to identify clear network boundaries (Bachmann et al., 2015; Pirson & Malhotra, 2011). For instance, internal network density was argued to affect trust formation either positively within the network (Ferrin et al., 2006) or negatively across networks (Jonczyk et al., 2016). What also matters is the network context. Reciprocity in a friendship network may work differently from how reciprocity in an advice network affects trust dynamics given their underlying expectations of (a)symmetry. Furthermore, we propose to pay attention to hierarchical or status differences involved in the relations. Depending on the hierarchical level of the trustor, the trustee, and the third parties, trust development shows different features. Hierarchy in leadership could offset incomplete transitivity in leading to trust formation (Lau & Liden, 2008). De Cremer et al. (2018) and Fulmer and Ostroff (2017) also developed a trickle-down and a trickle-up model across hierarchical levels and found that trust can be transferred from subordinates to top managers via a direct supervisor. Thus, hierarchy influences the direction of trust transfer and trust formation. Future work could also look into the effect of sudden network changes due to exogenous network factors on interpersonal trust

dynamics. Recent work on intra-organizational network disruption, for instance, identified the role of sudden tie loss as an exogenous trigger for an individual's inclination towards discretionary new tie formations (Aalbers, 2020). A related mechanism may hold for the trust dynamics in these relationships.

Mixed Methods

In this review, we found that some findings are inconclusive because of the usage of different methods. For instance, in longitudinal studies reciprocity was found to contribute to trust formation over time (Barrera & van de Bunt, 2009; Robins & Pattison, 2001), while in a cross-sectional study trust ties did not show a significant reciprocal effect (Lusher et al., 2012). This implies that reciprocity increases trust formation over time, whereas trust is not always reciprocated (Schoorman et al., 2007). The same issue also exists in the relationship between structural equivalence and trust formation. This might inspire future research to use mixed methods to enhance the validity of the results. Moreover, endogeneity problems are present in many network studies (Ellwardt et al., 2012), and they may also occur in examining the relationship between network embeddedness and trust dynamics. Recently, network studies have started testing theoretical models using mixed methods (e.g., a combination of a cross-sectional survey and an experiment, see Dirks & Skarlicki, 2009; a combination of two cross-sectional surveys and an experiment, see McCarthy & Levin, 2019). Given the possibility to examine causality in longitudinal studies, and correlations in cross-sectional studies, as well as the flexibility in terms of research design in experiments, we propose a combination of multiple methods to test the relationships between network embeddedness and trust dynamics.

Limitations

The first limitation concerns the selection criteria that were used to include articles in the systematic literature review. Articles from journals with lower impact factors were excluded to warrant the quality of the

reviewed work. This increases the risk of missing articles that may also be relevant. Although the formal selection criteria included quantitative articles, possibly missing important theoretical and qualitative research, additional literature has been considered as background information. Content-wise, we narrowed the literature down to interpersonal level interactions, while we did not consider articles concerning trust in organizations, teams, or groups. Although this choice allows sufficient depth to analyze the literature by focusing on trust at the interpersonal level, we admit that a review of trust incorporating other levels would enrich the theoretical system. Finally, we focused on the dynamics of trust in three stages while we did not shed light on the dimensionality of trust. We believe that network embeddedness may produce different effects on separate dimensions of trust (e.g., affective vs cognitive dimension) and that this topic deserves further attention.

Practical Implications

Our research provides several implications for practitioners to build and repair trust in an organizational context. Our findings unveil a series of network factors that can explain trust dynamics. These factors could serve as a foundation for future trust-building and repair activity by management. Trust dynamics form the informal backbone of an organization—and our findings allow management to better understand the social infrastructure that partially carries a firm's trust climate. As such, our research implications extend prior work that directs senior executives seeking to implement strategic change to consider the social structures as a way to get employees connected and reconnected with each other, thereby improving individual and organizational performance.

We find that network structures are an important antecedent that is malleable for managers to improve trust networks between employees. First, increasing organizational network density can increase the possibility of trust building within the organization because in a dense network people are less likely to adopt opportunistic behavior. Managers can improve trust formation by encouraging internal interactions, such

as organizing formal and informal activities, between employees. Meanwhile, increasing density internally may have a negative effect on extending ties to other organizational units—a trade-off managers have to be aware of. Depending on the organizational goals, managers need to help build and at the same time balance the internal and external networks of their employees. In a sales organization, wherein employees are supposed to reach out to external stakeholders, managers not only need to stimulate an internal climate of trust and network density but also need to create space to develop external networks.

Second, third parties can help mediate after a trust violation and repair trust between the trustor and trustee. Managers can orchestrate a third-party coordination mechanism to repair trust between employees. In some cases, parties involved in a trust violation lack the motivation or opportunity to be reconciled. A third party can play a role in bringing both parties together. Giving that trust violations create a negative climate in an organization and may have a bad effect on individual and organizational performance, a third-party coordination mechanism thus deserves managers' attention and effort. Meanwhile, they should be aware that a third party needs to be neutral or have positive connections with both parties without being partial.

Third, we find that there is a potential tension between employees who occupy similar positions in an organization, which should draw managers' attention. Although two employees sharing a higher level of similar connections may be more likely to trust each other, they are also interchangeable and can be competitors. This consideration should also raise managers' awareness to coordinate relationships between such employees.

Managers may also want to know who occupies a central position in their organizational network. Occupation of a central position means power and access to resources. Such employees are likely trusted by others because of their possession of resources but also are likely questioned and doubted by others because they control resource flows. To effectively run the organization and improve organizational functionality, managers should be able to influence and manage centrality. For instance, managers may need to reward and retain an employee who occupies a central position and is trusted by many colleagues. Managers

may hope to mitigate the conflicts between a central employee and others when that employee is disliked by others because he/she controls and takes advantage of the resource flows between others.

Finally, our insights signal why and when individuals turn to their social network environment to obtain cues when looking for information regarding who can be trusted and whether it is worthwhile to repair trust. Employees often encounter a dilemma in which they want to collaborate with a colleague but do not know whether that colleague is trustworthy, or they might hesitate to forgo or repair a relationship when their trust in someone was violated. Our insights suggest that in such cases, network structure, such as tie strength, provides a cue for individuals to judge whether that person can be relied on in the future. Although practitioners are limited in the information that they can directly obtain, the network environment provides them with possibilities to obtain and process additional information from their contacts. Management, in turn, could invest in the monitoring and screening of individual relational and trust profiles in preparation for future interventions, as a manner to help direct the potentially limited support resources more effectively and in a manner that retains or restores trust levels in the organization.

Practitioners might be confused of how to make use of the network structures since neither interpersonal interactions nor network ties among employees are overt. Research shows that social network analysis can make these interactions visible by analyzing and visualizing them (Cross et al., 2003). Practitioners are able to make use of the networks to improve the organizational trust climate and performance, bearing in mind network characteristics and trust-network associations. To summarize, such awareness and knowledge are the main practical implications of our research.

Contributions

This chapter looked into the trust-network link as a potential answer to how organizations can make use of the understanding of their social networks to develop and repair trust among employees. First, we

extended the research of trust from an individual phenomenon into an organizational context by adapting a network perspective. Considering the social nature of trust, we showed that it is necessary to complement prior research by studying how network ties influence trust (Ferrin et al., 2006). We identified relational and structural dimensions of network embeddedness that affect trust dynamics. By doing so, we responded to the call to integrate psychology and network perspectives to investigate organizational phenomena (Casciaro et al., 2015). Second, we deepened the understanding of the complete trust dynamics process by investigating trust dynamics as a process of trust formation, decay, and repair. We observed that, compared to trust formation, trust decay and repair received far less attention from a network perspective; trust repair is mostly studied in experimental settings. To conclude, in this chapter, we have identified major research gaps, proposed promising avenues for future research, and suggested practical implications for management.

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