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When Twitter launched in March 2006, the earth did not move. Its founders and a few early funders were excited about the technology, but the microblogging site was not the immediate blockbuster you might imagine it was, given that it now has more than 300 million users and has become a wildly influential marketing tool for businesses, nonprofits, and even politicians. Rather, Twitter crept along in its early months, growing slowly.

So, what happened to transform it from another also-ran into one of the largest communication platforms in the world?

Twitter seems on the surface to be the kind of technology that journalist Malcolm Gladwell and Wharton School marketing professor Jonah Berger refer to as “contagious.”<sup>1</sup> To jump-start Twitter’s growth, its founders decided to promote it at a South by Southwest (SXSW) Interactive conference in 2007, where it was a big hit. From there, people assume it rapidly spread across the United States through the internet, thanks to social contacts connected by what network researchers call “weak ties” and “long bridges.”<sup>2</sup> Two years later, in 2009, Twitter adoptions were catapulted into a global orbit when a major opinion leader, Oprah Winfrey, sent her first tweet on her talk show.

That narrative is easy to grasp and compelling. It gives startups, and the people who invest in them, a road map for success. Unfortunately, it is also inaccurate, and the road map leads to a dead end.

In a very interesting study, Twitter’s actual growth pattern was revealed to be surprisingly geographic.<sup>3</sup> Friends and neighbors adopted the technology from one another in much the same way people join a PTA fund-raiser or get excited about a candidate for town office. Twitter

didn't spread virally across the internet; it spread locally, like a grassroots social movement.

Although that explanation of Twitter's success is less sensational than the usual "going viral" story, it is far more useful for understanding how social networks promote behavioral change. And it corresponds with a growing body of research that describes behavioral change as a *complex contagion*, which needs *reinforcing ties* and *wide bridges* to spread. We'll explore those concepts here. They are key elements in a diffusion playbook for companies attempting to launch innovations and facilitate both customer and employee adoption.

## Contagions: Simple Versus Complex

Let's begin by discussing the essential but often-recognized distinction between two kinds of contagions: simple and complex.<sup>4</sup> Simple (or viral) contagions, such as the transmission of the flu or measles, spread through a single activated contact. Complex contagions, such as the adoption of new behaviors, require multiple sources of exposure.

Even though there may be only one person in your network who has the flu, if that person sneezes on you, you are likely to catch it. If you in turn sneeze on others, they can also become infected, and so on. The germs move fast. At no point does anyone need to be persuaded to get sick.

Like the flu, most information spreads via simple contagion. If you learn the score of today's playoff game, you can easily repeat it at a party. Anyone who hears you also learns the score and can just as easily repeat this

information to others. News propagates effortlessly through a network.

That's not the case for technological innovations and practices — or, really, anything involving meaningful behavioral change — because adoption often involves financial, psychological, or reputational risks. At least four psychological mechanisms help explain why a complex contagion requires multiple sources of reinforcement:

- **Strategic complementarity:** The more people who adopt an innovation or a behavior, the more its value increases. Even free and/or easy-to-adopt technologies, like Twitter and Facebook (and phones and fax machines), take time and exposure to spread, since their value increases with the number of users you know.<sup>5</sup>
- **Credibility:** The more people who adopt a behavior, and the more we trust them, the more believable it is that the behavior is worth the cost or risk of adoption. Credibility matters a great deal when individuals or organizations decide whether to invest in expensive new technologies, for instance.
- **Legitimacy:** The more people who adopt a behavior, the greater the expectation that others will approve of the decision to adopt and the lower the risk of embarrassment or sanction. Think fashion trends.
- **Emotional contagion:** The more people who adopt a behavior, the more excited other people get about adopting it. This is the mechanism at work in a **workshop** where participants reinforce one another's enthusiasm about learning a new practice.

At the heart of all four mechanisms is a need for social confirmation from more than one person. That's something we all tend to seek in "adoption" decisions, such as investing in a new technology or market or selecting a partner for a new venture, because the stakes are high and we want to mitigate risk. Whereas multiple *exposures* to the same individual may be sufficient for simple contagions to spread, multiple *sources* of exposure are needed to transmit complex contagions. If we know many people who can vouch for the new technology or business partner we're considering, we'll feel much better about diving in.

## Social Ties: Weak Versus Strong

Once we acknowledge that behavioral change is a complex contagion, we must also reconsider the conventional wisdom regarding weak and strong ties in social networks.

The distinction between weak and strong ties, introduced by Mark Granovetter in the 1970s, is powerful and clear: Your casual acquaintances — the people you meet at a conference, in an Uber car, or on a cruise — are your weak ties. They are random connections that link you to new people. They are your outer social circle. Conversely, your close friends and family are your trusted strong ties. They make up your inner social circle.

Granovetter found that strong ties are not a great way to spread a new idea.<sup>6</sup> Why? Because they all know one another, so there's redundancy. Even if your message is sticky and popular, if it spreads only through strong ties, it keeps bouncing around the community of people who already know about it.

Granovetter identified weak ties as the solution to this frustrating problem. They connect you to people and ideas that you would never discover through your strong ties. They are the best people to enlist in your promotional campaigns precisely because you do not know them very well. And they connect you to strangers — people you don't know at all and, most likely, never will. They give your idea *reach* by creating an invisible link from your network to parties to which you have no direct access.

Indeed, the power of influencers like Oprah Winfrey comes from the fact that they have so many weak ties in their social networks. Their messages reach hundreds of social circles, exposing an idea not only to many people but also to many kinds of people. That exposure is the essence of viral diffusion.

For simple contagions, weak ties are all you need. But while Granovetter argued that "whatever is to be diffused" will spread most effectively through weak ties, we cannot generalize from the spread of simple contagions to the diffusion of complex contagions.<sup>7</sup>

As it turns out, you need redundant ties to get people to adopt new behaviors, and most executives are not aware of that. They are more likely to subscribe to viral theories of innovation diffusion, following the lead of Gladwell, who wrote, "Ideas can be contagious in exactly the same way that a virus is."<sup>8</sup>

In fact, the more complex a contagion, the more its diffusion depends on social confirmation from multiple sources. For the same reasons that Granovetter said strong ties inhibit simple contagions like information sharing, they facilitate complex contagions like innovation adoption.

## Bridges: Narrow Versus Wide

The trust that is inherent to strong ties is not the only advantage they offer for spreading a complex contagion. Their most important feature is the reinforcement that results from multiple sources of exposure. That's why a nuanced understanding of *bridges* is a key to understanding diffusion.<sup>9</sup>

Ever since Granovetter's pioneering work on diffusion, connections between distant parts of a population have been called bridges. We typically gauge their value by their length (the distance spanned by the bridge), and we think of long bridges as pathways for weak ties to do their viral work. They spread simple contagions through reach, not redundancy. For instance, in a company where the members of the engineering team do not have any direct contact with the members of the sales team, let's say one engineer, Jacob, goes out of his way to connect with one of the sales associates, Rashid. The tie between Jacob and Rashid is the only tie between the two groups, and because this tie connects two distinct parts of a social network, it acts as a bridge between them, without which there would be no direct communication. A bridge, in other words, is a long-distance tie.

The more enterprising Jacob is, the more of these ties he can seek out. He can create bridges to the manufacturing, design, and marketing groups. By doing so, Jacob will provide a great service to the organization because these bridges will accelerate the spread of new information. Not incidentally, because he has so many long-distance ties across the organization, he also positions himself as a very important actor in the organizational economy of information brokering.

But we also can measure bridges by their width (the number of ties they contain). What if, instead of forming new ties to so many different departments, Jacob instead introduced Rashid to some of his engineering colleagues, and Rashid, in turn, set up a few meetings to create connections between the other sales associates and some of Jacob's friends in engineering? These interactions would establish new pathways of communication between engineering and sales. From Jacob's point of view, some of his structural advantage has been lost. He's no longer the sole broker for information flow between engineering and the other groups. The bridge between the engineering and sales teams has become much wider, and it now comprises several close ties instead of one long-distance tie between Jacob and Rashid.

Why would Jacob trade his unique brokerage position at the intersection of engineering and several other departments to create reinforcing ties between engineering and sales? Doesn't having fewer long-distance connections slow down the diffusion process for simple contagions? It does, but for complex contagions, long-distance ties are precisely the problem. A signal that travels across a narrow bridge arrives alone, without any social reinforcement. In other words, narrow bridges do not create useful pathways for complex contagions to diffuse.

In addition to not helping, narrow bridges can hurt diffusion. Efforts to create more-efficient pathways to accelerate information flow between weak, distant ties can inadvertently erode the social reinforcement that is necessary to maintain behavioral influence. For instance, suppose everyone in the engineering group follows Jacob's enterprising lead of creating brokerage ties across the organization — and in the process, they neglect their “in-

group” ties to members of engineering in favor of cultivating “out-group” ties to members of other divisions, such as accounting and customer service. As these social entrepreneurs do more networking across the organization, they’ll maintain fewer connections inside engineering. The ironic result: An initiative to spread a new innovation within their team may fail because the engineers have become so focused on their weak ties that they have minimal connections left in their own group. This has implications for any setting in which creating networks for speedy information diffusion may undercut the goals of spreading a behavioral innovation — for instance, when you’re trying to grow group solidarity, spread complex technical knowledge, or diffuse new cultural norms in an organization.<sup>10</sup>

Narrow bridges are where the viral story of Twitter’s success goes wrong: Just because one person you know uses Twitter, that will not necessarily convince you to use it, too. Learning about it quickly through that single contact won’t spur adoption. It needs to be worth your time. The reason we use Twitter is because lots of other people are using it. Without them, Twitter is useless. Wide bridges made Twitter a success.

And not just Twitter. In the past few years, researchers have found that Facebook and Skype also spread through complex contagion — for the same reason as Twitter.<sup>11</sup> They are all worth adopting only if many of the people you want to interact with have also adopted them. Particularly during early diffusion, social reinforcement through wide bridges is essential. Redundancy, not reach, is the mantra for diffusing complex contagions.

## Spreading Innovations in and Across Organizations

The story of Jacob the engineer also illustrates sociologist Ronald Burt’s concept of structural holes, which is the source of what is perhaps the most influential application of network theory to organizations.<sup>12</sup> Burt defines a structural hole as a gap between two diverse social clusters that prevents access to nonredundant information.

The strategic benefits for individual brokers who bridge structural holes are enormous. They have exclusive access to new information. And they are more likely to be included in new opportunities, because their visibility is increased by the diversity of their contacts. These benefits beget more benefits: For instance, brokers’ access to novel information makes them more attractive ties for other people looking to establish brokerage connections.

In turn, those benefits can translate into organizational value. Without brokers, information would fail to diffuse beyond established clusters. Bridges that span structural holes have thus been argued to play an essential role in promoting cultural exchange and knowledge transfer within and across companies.<sup>13</sup>

But brokers are less valuable for promoting innovation adoption and other behavioral changes in organizations. They are unlikely to transmit practices or norms that require social reinforcement, for three critical reasons.

First, an individual broker is not necessarily trustworthy. That person can exploit both sides for his or her advantage, and both sides know that the broker is the

only link between the two otherwise disconnected groups. This may not have any significant consequences for simple information sharing, but for the spread of a new business practice or adoption of a costly new tool, the sincerity and trustworthiness of the messenger can be just as important as the message. <sup>14</sup>

With wide bridges, however, individuals on both sides of the bridge have multiple contacts in common. Thus, the potential for reputation effects at both ends puts constraints on the actions of the bridge members. <sup>15</sup>

Careless or exploitative behavior by a bridging individual is likely to be detected and therefore less likely to happen. Wide bridges between groups increase the trustworthiness of messages coming from other parts of an organization.

Second, one group's innovative new technology or practice is not necessarily useful to another group. Even if a broker has good intentions, the interests and goals of an innovating group may feel too different from those of a receiving group to merit adopting the change. <sup>16</sup>

But a wide bridge between groups can smooth adoption. If multiple members of a receiving group share contacts in common with members of an innovating group, the credibility of the change increases. For instance, if one team in an organization has multiple contacts with colleagues on another team that has adopted a new kind of project management software, that allows them to observe how easily the members of the innovating group

work together to use the new software and how effective it is for improving their performance. These reinforcing exposures increase the likelihood that the receiving group will be willing to coordinate on adopting it. <sup>17</sup>

Third, a single broker between two groups is a fragile bridge. Indeed, the power that an individual gains from holding this structural position is due in part to the costs an organization will face if he or she leaves. Redundancy eliminates this advantage. Wide bridges endure even as individuals come and go.

The advantages of wide bridges over brokerage ties are especially relevant to partnerships between organizations. The wider the bridges are between organizations, the more reliable and enduring these relationships are likely to be, and the more influence they will have over each organization's culture and the adoption of innovative practices. <sup>18</sup>

When we realize how often the dream of virality does not take network context into account, it becomes easier to understand why so many innovation initiatives and change efforts fail. To appreciate the context of a contagion is to appreciate how susceptible new-behavior adoption is to both countervailing influences and positive reinforcement. If we cultivate that understanding and rely on strong ties and wide bridges to spread innovations and pursue behavior change, we can dramatically improve the success of our diffusion efforts.

## About the Author

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