

The anthropological study of infrastructures in today’s rapidly advancing digital world is more important than ever due to the “feelings of promise” that these new infrastructures can create (Larkin 2013, 333). Robinhood Markets, hereafter referred to as Robinhood, is a mobile application designed with a similar notion of ‘promise’ in mind. Launched in 2013 by two ex-Wall Street systems designers, Robinhood seeks to circumvent existing financial market infrastructures through its own infrastructure—with the goal to allow for anyone in the United States to begin trading on the stock market (Morrisey 2017). With its commission-free trades and zero dollar initial investment, the platform promises to provide a gateway to the market for outsiders, such as Millennials. The founders of Robinhood have targeted this demographic as their customer base (Richmond 2016), and it is easy to see the reasons why: their propensity towards smartphones—77% in the U.S. own one (Smith 2017), as well as their financial status—70% have less than \$1,000 in savings in the U.S. (Huddleston 2016). The targeted development of the application seems to be working, with around 80% of Robinhood’s one million users being Millennials (Huang 2015).

As a result, it is necessary that we examine Robinhood’s infrastructure to see how it “can offer insights into other domains” (Larkin 2013, 328). This paper will examine how new technological infrastructures that are built on existing infrastructures subsequently alter those that they are founded on. To explore how this happens, we will first focus on the ‘market’ and the dichotomous relationship therein between the social and the rational. This relationship will be examined with an eye towards the process of rationalization in the market. From there we will see how technology and rationalization are directly related but not always in a linear fashion, drawing from Caitlin Zaloom’s ethnography of digital technologies integration into markets. Finally we will apply these findings to Robinhood, delving into the way that its infrastructure ties to that of the ‘market’, and more specifically how Robinhood’s unique infrastructure and design has changed the way the market is perceived and interacted with. It will be shown that in Robinhood’s attempt to

further rationalize the market through its 'promising' infrastructure, it ultimately furthers the gap between the social and the rational in the market relationship.

### **The Market**

Market in this essay will refer to financial markets, and specifically the stock market when referencing Robinhood. The market has been traditionally divided in how it is perceived and interacted with, either "viewed with confusion or seen as a rationalized entity" (Zaloom 2006, 4). These opposing views can be taken in an infrastructural light in that "one person's infrastructure is another's topic or difficulty" (Star 1999, 380). Those who see the market as confusing are the outsiders, the ones without a stake in it, those who observe it from afar: the 'difficulty' camp. For those inside the market, it is a rational entity operating in a logical manner: the 'infrastructure' camp. Immediately we can see two opposing perspectives on an entity arising from the same underlying infrastructure. This will be important in regard to how Robinhood's infrastructure affects the perception of the market's infrastructure.

An omnipresent ideology that stems from this divided view of the market is that the 'social' must be kept out in favor of the 'rational'. Weber posited this, expressing that the pure market will be that in which social relationships are non-existent (1978, 636). This removal of the social in order to achieve an idealized market is understood as the process of rationalization. The market in this sense becomes a 'whole' unto itself, which can only be reached through the rationalization of its components. The process of rationalization is complicated when we understand this distinct 'whole' of the market "as an object of attachment" (Cetina and Bruegger 2000). It would follow that the transcendent 'whole' is what participants in the market attach to, as opposed to the parts and thus the infrastructures that comprise it. This relationship of attachment to the pure market is important when combined with Crary's "means of perception" (1990). These 'means' affect how the individual perceives the 'whole', and thus impact how they subsequently interact with it. As the

infrastructures of the market are rationalized, washed of their social ties, they in turn directly affect the way the 'whole' of the market is perceived and attached to by the individuals who constitute it.

This separation of the market from the social is seen in the way numbers, as well as money, are represented by infrastructures in the financial market. Numbers in these infrastructures of the market are treated as "essential tools of rationalized action" (Zaloom 2006, 142). This premise is why all market infrastructures are built around numbers—Robinhood not excluded. Zaloom further states that there is a "reliance of capacity of numbers to convey abstract and objective information" (2006, 143). This objective information is that which is devoid of the social. Numbers and information in the market should have "self evident meaning" (ibid. 144) and the infrastructures should thus display them in this rational, simple form. However, Zaloom points out that traders do not use numbers strictly in their objective form. Rather, they "combine abstract information and social narratives" when using these numbers (ibid. 159). The infrastructures designed in order to rationalize these numbers are subsequently instilled with the social by those who utilize them.

In breaking from the larger systems of infrastructure in financial markets, we can turn to how the individuals who employ these infrastructures play a role in the rationalization of the market. This goal of rationalization becomes muddled when we see traders attempting it on a personal level in order to diminish the gap between them and the 'whole' market (Zaloom 2006, 128). For example, traders change the numerical representations displayed by these infrastructures from U.S. dollars into 'ticks' (2006, 130). Maurer touches on why this abstraction is problematic, explaining that when money is studied as exchange, it solely favors "the relationship to the fictional 'pure' market" while discarding all other relationships (2015, 76). Maurer's assertion about money directly parallels market rationalization. The infrastructural systems in financial markets that display dollar amounts have been rationalized in order to convey objective information.

Simultaneously, traders attempt to rationalize themselves as individuals when they convert money

from its numerical representation on these systems into these ‘ticks’. It would seem that both the infrastructure that displays the numbers and the trader concurrently attempt to rationalize the market. Here we can see that there is a desire to reach the ‘whole’ market through the rationalization of the parts that make up the infrastructures of financial markets. In essence, rationalization on the individual and system levels seeks to bridge the gap from confusion to understanding, but in doing so the infrastructures that are built around this endeavor are further imbued with the social relationships that they seek to circumvent. As Maurer said regarding money: “it cannot work without the technology and infrastructure enabling it” (2015, 76). The elusive, pure market—that object of attachment—would not work without the infrastructures that comprise it.

### **Technology and Market Rationalization**

The process of rationalizing the market, as we have seen, is far from simple. The utopic rationalized market is consistently dogged by the social, no matter what infrastructures may be integrated to try and eliminate it (Zaloom 2006, 177). Looking to how technologies have affected this process of rationalization and the relationship to the distinct ‘market’ will provide a foundation for not only an examination of Robinhood, but for financial markets altogether. To begin, the analog technology of the trading pit—the physical space in which traders interact with and constitute the market—affected how the “traders perceived the market” (2006, 141). Even with an early technology such as this, we see an infrastructure designed to rationalize the ‘market’ subsequently change how the parts of this infrastructure, those that comprise it, interact and perceive the whole. The telegraph, and the free flow of information that it heralded, “made the market appear as a separate thing that is simultaneously all of its parts and a transcendent thing as well” (Carey 1992, 220). The telegraph, then, solidified the dual relationship of the market and intensified the rationalization processes undertaken to bridge this gap.

When digital technologies were implemented into trading, they “challenged the market form” (Zaloom 2006, 55). These technologies were forcing change onto the existing infrastructures of the market. Simultaneously, they were being constructed “on an installed base” (Star 1999, 382). This base—while being rooted in physical components such as federal regulations, laws, geographic limitations, etc.—can also be taken on a conceptual level. What all of these technological infrastructures in financial markets come down to is the need to “distill economic content of the market by removing the social” (Zaloom 2006, 141)—to rationalize. Zaloom said it best in that “technological rationalization supports the idea that eliminating human intermediaries provides greater contact with the ‘true’ market” (2006, 175). In treating rationalization, this idea, as a ‘base’, we can see that it has been an unwavering desire inherent in the market relationship from Weber to present day.

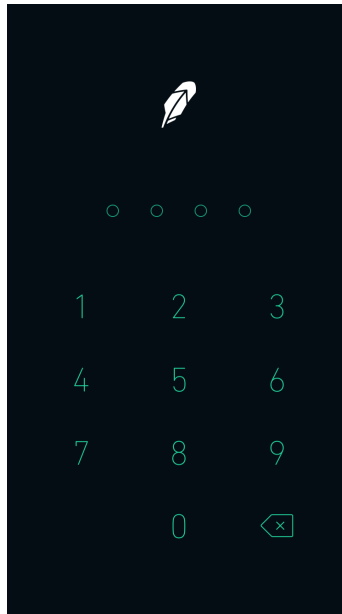
How these technologies and their infrastructure have altered the relationship to the ‘whole’ of the market has intensified. All of these market infrastructures “shape the information available” in financial markets (Zaloom 2006, 141). This shaping of information by the infrastructures further widens the gap between the individual and the market, shifting them towards “an observational viewpoint of the ‘whole’” (2006, 141). Rather than bridging the gap, pushing the participant towards the ‘whole’, they abstract the individual from it. The infrastructure in this case alters the individual’s epistemology of the market, their perception and attachment to it. We saw this earlier with the traders’ use of numbers generated by these systems, and their own rationalization of them. Rather than perceiving and interacting as a part comprising the whole of the market, they now are further apart from the elusive ‘whole’.

### **Robinhood**

Now that we have articulated the divide between the part and ‘whole’ in the market, the social and the rational, we can finally turn to Robinhood. Here we will heed both Larkin and

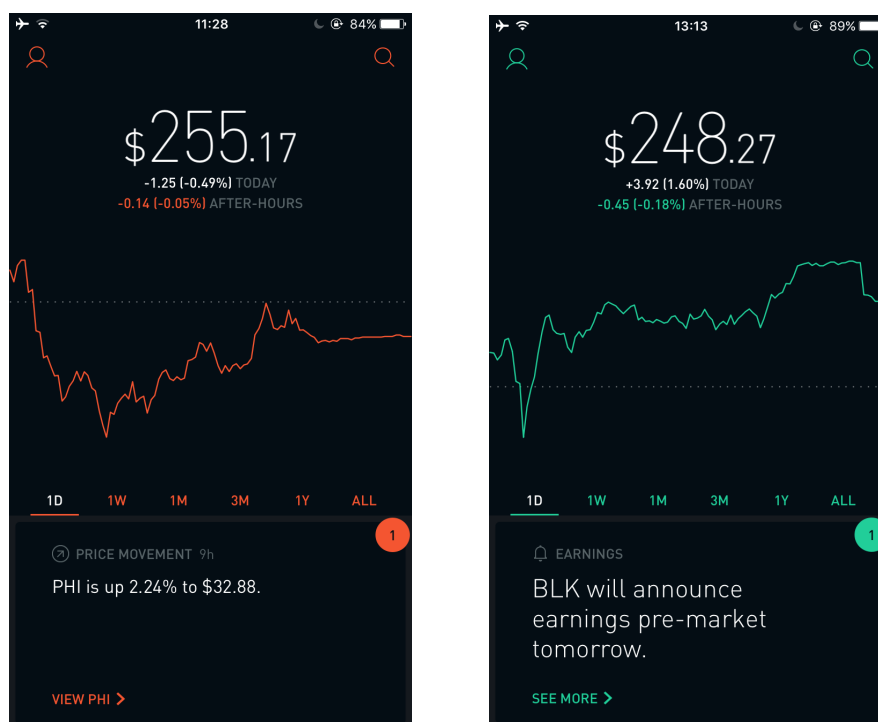
Zaloom’s advice. To begin, Larkin asserted that viewing the system (in our case Robinhood) as the focus of analysis will shift the focus away from technology, and “offer a more synthetic perspective—bringing in non-tech elements” (2013, 330). This will provide insights into what Robinhood’s infrastructure does outside of just being another representation of the market. In addition, Zaloom asserted that there needs to be a “focus on the relationship between technologies and practices—ways of thinking about and acting in the market—that are linked through experiments in rationalization” (2006, 171). This is what we hope to explore here, and as such we will treat Robinhood as one of these experiments. We will conduct this experiment by inspecting different sections of the app, exploring how they relate to the aforementioned concepts regarding the market as a distinct ‘whole’, and how infrastructures change the perception and interaction of the individual and the market—ultimately determining if Robinhood’s goal is promising or hollow.

When first downloading and launching Robinhood on their mobile device, the user must fill out an application and provide their bank information before they can make an initial deposit into Robinhood and begin to invest. Immediately it is apparent that Robinhood is not inseparable from those infrastructures that underlie financial markets. However, there is a kind of “institutional leapfrogging” created by the infrastructure of Robinhood (Bar and Galperin 2004). While not as closely tied to the physical embodiment of infrastructure that Bar and Galperin discuss, Robinhood allows the user to circumvent institutional barriers that have traditionally reinforced the ‘difficult’ and ‘confusing’ nature of financial markets. Rather than having to go to a bank and fill out an application, then sign up at a brokerage firm, Robinhood is a one-stop shop. But it is the culmination of these institutions and infrastructures into one mobile app that—while seemingly simplifying the market for the prospective investor—need be scrutinized to understand the impact that this consolidation has. In this leapfrogging, the user is afforded expedited entry into the market but at what cost?



**Figure 1:** Lock screen

This is the login screen displayed when opening Robinhood. Star's earlier assertion that infrastructures need to be built "on an installed base" (1999) is present in the design here. The 'base' is visible in the keypad: it is identical to that of the iPhone's lock screen. In tailoring the application to resemble the iPhone's default infrastructure, it would seem the designers were attempting to reduce the learning curve of the "language" of the infrastructure (Larkin 2013, 337). With Robinhood's promise to provide accessibility to the market and their target audience being Millennials, it makes sense that they would design their infrastructure in such a way.



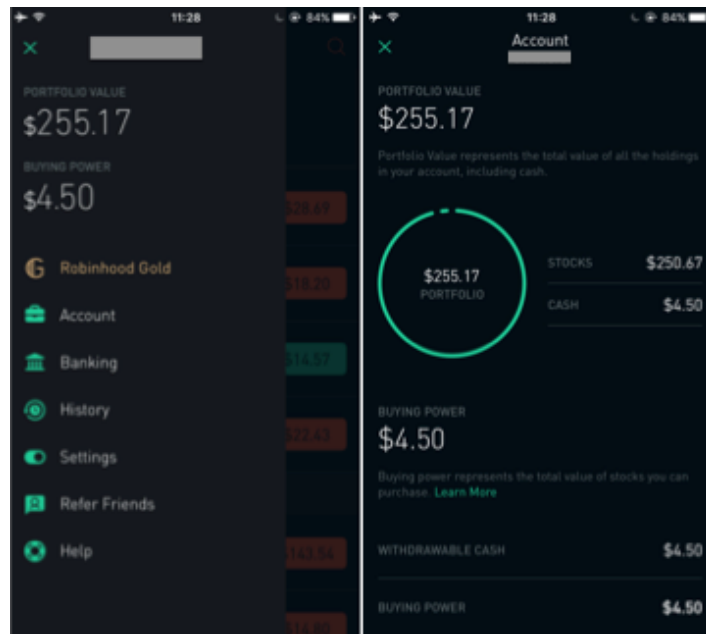
**Figure 2:** Homescreen(s)

The above is the home screen of Robinhood, which the user arrives at after proceeding through that on Figure 1. The simplicity of the interface is instantly apparent. Green is used to indicate that the user's portfolio has a net gain, red to indicate a net loss. There is a line graph which illustrates the movement of the portfolio throughout a given time period, with the ability to view different timescales. Lastly, there is the big white number displayed at the top. This represents the portfolio's total value at that moment in time. The intention here was to present the information in such a way that the "sparse visual design" could "reduce the gap between part and whole with the representation of numbers" (Zaloom 2006, 153). As with the other forms of technological rationalization, Robinhood evidently is aiming to eliminate barriers in the relation between the part and the rational 'whole' market. The "numerically rationalized representation of the market" is illustrated in the bare bones infrastructural design (2006, 152). This seems all well and good: Robinhood is getting the user as close as possible to the pure market through its clever



infrastructural design. This should alleviate the ‘confusion’ and ‘difficulty’ that the market is viewed with and achieve their promise...right?

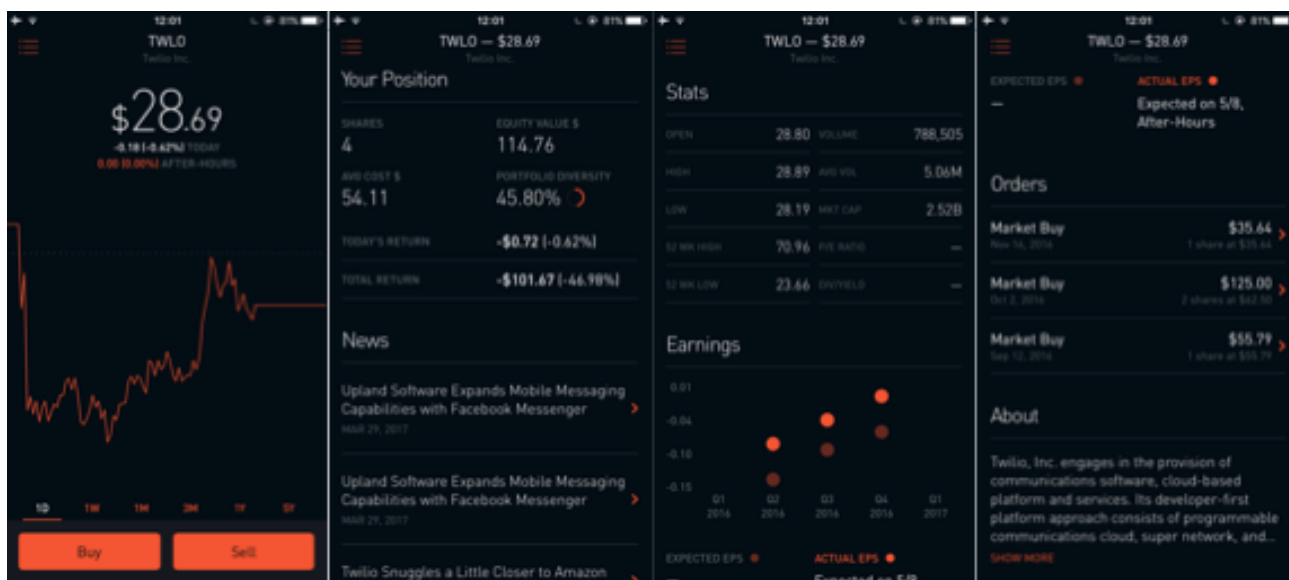
Not quite. The number represented here is the user’s total value of their stocks. The infrastructure of Robinhood does not provide a representation of the overall market, that ‘whole’, which traders normally desire to understand and relate to. Rather, Robinhood’s infrastructure creates a vacuum, isolating the individual’s part of the market from the whole of which it relates to. In doing so, the infrastructure directly impacts how the user perceives and interacts with not only their part of the market within Robinhood, but also the market overall. An infrastructure that was designed around rationalizing existing infrastructures (which were also designed to rationalize the market) instead significantly alters the market relationship.



**Figure 3:** Account overview

The two items of note here are the numerical values: ‘Portfolio Value’ and ‘Buying Power’. As with the traders attempting to rationalize themselves on an individual level by abstracting money into ‘ticks’ in order to better relate to the market, here Robinhood’s infrastructure performs this abstraction for the user. In trying to rationalize through simplification, they instead widen the gap

between the individual and the market. They are molding the displayed information to alter how the user perceives their investments in the market—just as Zaloom discussed earlier. There is a juxtaposition, where Robinhood’s desire to rationalize the market through a stark infrastructural representation, to make it less confusing and difficult, instead pushes the user further away. But further away from which ‘whole’? As Robinhood fails to represent the whole of the market, what happens to the larger market relationship here?



**Figure 4:** Overview of one company that the user owns shares in, Twilio.

The culmination of Robinhood’s simplified infrastructure can be seen in Figure 4. On the left is the stock’s overview page. Here the user can track its performance over set periods of time—green and red for positive or negative on the graph and interface—as well as ‘buy’ or ‘sell’ shares. As we have focused on the graphs already, we can turn towards the buy and sell buttons. The infrastructure of the application from a design perspective presents the user with just these two simple options. However, financial markets have a vast array of trading options, not to mention investment strategies. While Robinhood does present these two options in a simple way to the user, it does not do so solely because it wants to fulfill its promise of rationalization. Instead, it is also due to the way that Robinhood is integrated into the existing market infrastructure. As a result of

being a bare bones trading platform, they cannot provide the other types of trades that are available in financial markets. So in having users join a microcosm of a market that the individual then perceives due to its infrastructural design as their own whole, what does Robinhood achieve?

There are numerous questions to be asked and further areas of study necessary in this contemporary relationship to the 'market'. As we have seen here, the eternal push to extrapolate the social from the market has become intensified as technologies of infrastructure have advanced. While these new infrastructures such as Robinhood may seemingly bridge this gap, rationalizing the part towards the whole, they are also further problematizing this relationship. Further study of platforms such as Robinhood need to be conducted in order to better understand the impact that these infrastructures can have on the attachment and perception of the market 'whole'. Most importantly, analyzing these applications from an infrastructural perspective will provide a greater understanding of the market relationship and the processes of rationalization that take place.

### References

- Bar, F. & Galperin, H. 2004. "Building the wireless Internet infrastructure: From cordless Ethernet archipelagos to wireless grids". *Communications and Strategies* 54:2. 45-68.
- Carey, J. 1992. "Technology and Ideology: The case of the telegraph" in *Communication as Culture: Essays on Media and Society*. New York: Routledge. 220.
- Cetina, K. & Bruegger, U. 2000. "The Market as an Object of Attachment: Exploring Post-social Relations in Financial Markets". *Canadian Journal of Sociology* 25:2. 141-168.
- Crary, J. 1990. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. Cambridge, MA: MIT Press.
- Huang, D. 2015. "Young, Poor and Looking to Invest? Robinhood is the App for That". Wall Street Journal. Retrieved 20 April 2017 from <http://blogs.wsj.com/moneybeat/2015/01/06/young-poor-and-looking-to-invest-robinhood-is-the-app-for-that/>.
- Huddleston, C. 2016. "69% of Americans have less than \$1,000 in savings". Go Banking Rates. Retrieved 20 April 2017 from <https://www.gobankingrates.com/personal-finance/data-americans-savings/>.
- Larkin, B. 2013. "The Politics and Poetics of Infrastructure". *Annual Review of Anthropology* 42. 327-343.
- Maurer, B. 2015. *How Would You Like to Pay?: How Technology is Changing the Future of Money*. Durham: Duke University Press.
- Morrissey, J. 2017. "With no frills and no commissions, Robinhood app takes on big brokerages". New York Times. Retrieved 20 April 2017 from [https://www.nytimes.com/2017/02/18/business/robinhood-stock-trading-app.html?\\_r=0](https://www.nytimes.com/2017/02/18/business/robinhood-stock-trading-app.html?_r=0).
- Richmond, S. 2016. "How Robinhood Makes Money". Investopedia. Retrieved 20 April 2017 from <http://www.investopedia.com/articles/active-trading/020515/how-robinhood-makes-money.asp>.
- Smith, A. 2017. "Record shares of Americans now own smartphones, have home broadband". Pew Research. Retrieved 20 April 2017 from <http://www.pewresearch.org/fact-tank/2017/01/12/evolution-of-technology/>.
- Star, S.L. 1999. "The Ethnography of Infrastructure" *The American Behavioral Scientist*. 43:3. 377-391.
- Weber, M. 1978. *Economy and Society*. Berkeley and Los Angeles: University of California Press. 1:636.
- Zaloom, C. 2006. *Out of the Pits: Traders and Technology from Chicago to London*. Chicago and London: The University of Chicago Press.