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Master's Thesis of Business Administration

The Size of Userbase is not  
Everything: Investigating the  
Effects of User Heterogeneity on  
Platform Growth

August 2022

Graduate School of Business  
Seoul National University  
Strategy and International Management

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# The Size of Userbase is not Everything: Investigating the Effects of User Heterogeneity on Platform Growth

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August 2022

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# Abstract

The platform business model is becoming increasingly popular in recent years following the success of tech giants and unicorn startups alike. These multi-sided platforms create value by facilitating interactions between two distinct but reliant groups of users and complementors via network effects. While both groups are important and contribute to the overall platform ecosystem, little research examine the potential of users to aid platform growth outside their sheer numbers. This study takes a closer look at users and explores the potential effects of their differences in regards to various attributes such as skill, knowledge, fame, influence, and gender. This study presents the etchings of a theoretical framework grounded in extant theory that weaves in differential user attributes, their effects as well as potential mechanisms. I then use a case study approach combining both numerical and qualitative data analysis from a social platform in its early stages. Through this I uncover support for the theoretical framework proposed as well as discover new insights from the data itself that sheds light unto how users' heterogeneous attributes may affect platform growth. In the process, I challenge the assumption of direct network effects theory that users are homogenous and show that some

users are more valuable as they produce output that differ compared to others on a platform.

**Keyword** : Platforms, user heterogeneity, network effects, social networking sites.

**Student Number** : 2020 – 29700

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# Chapter 1. Introduction

Over the years, technological platforms have taken over our world and garnered tremendous interest in both the business and academic worlds (Gawer, 2014; McIntyre & Srinivasan, 2017). Startups based on the platform business model multiply trifold while traditionally pipeline firms diversify into platforms (Zhu & Furr, 2016). This doesn't come as a surprise seeing that the world's most valuable public companies are platform firms (Cusumano et al., 2020) and the setup is relatively lean with low costs to scale (Zhu & Iansiti, 2019). However, with any great reward comes great obstacles. Among these obstacles is the ubiquitous chicken-or-egg problem (Caillaud & Jullien, 2003) in jump-starting network effects. Network effects are one of the fundamental properties of networks that must be managed for a platform to stand a fighting chance (Zhu & Iansiti, 2019).

In this dilemma on whether to put company resources into attracting the supply-complementor side or the demand-user side, extant platform literature has thoroughly fleshed out the benefits and inner workings of the former. The motivation of this rich stream of research lies in that the value of a platform to users is highly dependent on the outputs of complementors, which are driven by indirect network effects (Katz & Shapiro, 1994). This focus on indirect network effects has left direct network effects, particularly among users, and its potential to aid in a platform's growth underexploited in comparison. Direct network effects are particularly important for social networking platforms that derive



value from connecting users to one another. While extant work does recognize the saliency of direct network effects by attracting a large userbase, the focus has been limited to its sheer size without much consideration of the difference among users.

In this paper, I argue that users are significantly heterogeneous in ways that ultimately can impact user engagement which is an important indicator of platform growth. I focus on a handful of attributes that users possess heterogeneously. Namely, skill and knowledge, fame and influence as well as gender. With the guidance of extant theories that act as anchors, I present the etchings of a theoretical framework that weaves in differential user attributes, their effects as well as their potential mechanisms. Mainly, I argue that users may gain more value from the presence of key individuals who possess desirable attributes such as knowledge and influence compared to regular users who do not. I expound on how the possession of these attributes may encourage other users to engage on a platform more frequently, which thereby allows key users to contribute more to the overall platform ecosystem than average joes.

In addition to vivid examples to support the theoretical framework, I also conduct a case study accompanied by detailed longitudinal data. This data is obtained from a stock investing social platform named Coffee House and details 6 months of its growth from the very beginning to the present. I chose to include this supporting study and specific context for a few key reasons that align with the wisdom of Yin (2003). Firstly, single case studies allow for an in-depth look and are ideal for investigating

complex social processes (Ozcan et al., 2017). Given that this study deals with the intricate and complex mechanisms that allow other users to gain value from the presence of key individuals, a micro-approach is better suited to gain a deeper understanding of such mechanisms. Secondly, the provision of rich data from the firm that includes nearly complete data on users allows for a closer look and further aids in our understanding. Such data is also extremely difficult to obtain and has not been accessible to researchers before. Through this preliminary analysis, I find real-world evidence that is in alignment with the proposed theoretical framework as well as insights that extend it. Overall, the insights give further reason to delve deeper into how valuable user attributes can aid platform growth beyond the efforts demonstrated in extant literature.

The main contribution of this paper is the refining of direct network effects theory in relation to platform strategy literature. Extant works in platform strategy literature indirectly assume a homogenous impact on the value gained by other users when a new user joins a network. This study challenges this underlying assumption by investigating the heterogeneous attributes of users and the potential impact on platform growth. Through the micro-analysis of interactions among users, I also unpack the mechanisms that enable key users to substantially add to the value of the platform ecosystem. Such contributions from these individuals have great potential implications for the platform as a whole on the aggregate level. In the process, diverse streams of literature including the literature documenting the effects of gender differences, human capital, celebrity

endorsements, fame, and influence are integrated with that of platform strategy. Another contribution that cannot be understated is the extremely rich and detailed empirical dataset that not only accurately captures user attributes but also details the development of the platform in its early lifecycle stages.

## Chapter 2. Literature Review

### 2.1. The Platform Ecosystem and Network Effects

“...in the digitally connected economy, the long-term success of a product or service depends heavily on the health, defensibility, and dominance of the ecosystem in which it operates” (Zhu & Iansiti, 2019, paras. 5)

Maintaining a healthy ecosystem that consists of the platform itself as well as networks of complementors, users, and customers is crucial to a platform’s success. One of the keys to this is the managing of network effects among these various partners (Cusumano et al, 2020; Zhu & Iansiti, 2019) who provide inputs that are outside of traditional firm boundaries (Santos & Eisenhardt, 2005). There are two types of network effects; direct and indirect network effects. Direct network effects occur when the value of a network increases when another user joins and enlarges the network (Katz & Shapiro, 1994). A classic illustration of this is seen when the value or utility derived from using a telephone network increases when the number of people using it also increases (Katz & Shapiro, 1994). This is simply because a larger network of users means a larger number of

people one is connected to.

Complementarily, indirect network effects occur when an interdependent relationship exists between two partner groups and the utility derived from one group increases when the other group grows (Hagiu & Yoffie, 2016; Katz & Shapiro, 1994). For example, app developers who are complementors on the iOS or Android platform. When a complementor joins the platform, they have the potential to create a new high-quality app that adds variety and thus, increases the value of the platform to a user. This is important as platforms need to offer superior functionality to overcome entry barriers (Henderson & Clark, 1990; Bresnahan & Greenstein, 1999) and complementors provide a way to do so. Indirect network effects also work to increase the value derived by complementors with the addition of a user to a platform. As platforms generally derive value from these positive feedback loops of network effects (Zhang et al., 2012; Abdelkafi & Tluscher, 2016; Kane and Ransbotham, 2016), traditional performance indicators such as revenue and profits are frequently forgone. Instead, various user engagement metrics such as the number of unique visits, platform traffic, and time spent on the platform are used as indicators of performance (Trueman et al., 2000). Therefore, in this paper, platform growth is conceptualized as increasing user engagement on a platform.

## 2.2. Network Effects and Growth Performance

Given the importance of network effects, it's not a surprise that

this stream of literature has flourished. In particular, the literature in recent years has revolved around complementors on the basis of indirect network effects to improve platform performance. This includes investigating complementor reactions to changes in governance (O'Mahony & Karp, 2020), policy changes (Zhang, Li & Tong, 2020), and owner–entry threats (Wen & Zhu, 2019) as well as ways to motivate them (Boudreau & Jeppesen, 2015) and factors that shape the complementor–platform interaction (Panico & Cennamo, 2020). While fruitful in their endeavors, these papers have left the potential of direct network effects highly underexplored.

On the other hand, a long line of research on direct network effects has established the saliency of attaining a large userbase in launching winner–takes–all dynamics (Besen & Farrell, 1994; Caillaud & Jullien, 2003; Katz & Shapiro, 1994, Noe & Parker, 2005) by increasing users' switching costs (Farrell & Klemperer, 2007). However, these papers do not look deeper into the different dimensions of user direct network effects aside from the sheer size of its userbase. The underlying assumption about direct network effects is that the heterogeneity of users does not impact the value gain in a significant way. This implies uniform value gain to the ecosystem when an additional user joins the platform. In actuality, this is not the case for platforms that often rely on inputs outside firm boundaries with users as one of these key agents who are responsible for part of a platform's outputs. This is especially so for platforms where users are exposed to each other, be it directly or indirectly. Whatever the

user outputs become part of the platform' s offerings to all who use the platform.

Some scholars have warned against a focus on only size as this can lead to wrong strategies or misleading research (Afuah, 2013). Many scholars took heed and began to explore the importance of network structure (i.e.: Cennamo & Santalo, 2013; Zhu et al., 2021). Meanwhile, Subramanian and colleagues (2021) looked elsewhere and considered the potential of users that goes above their sheer numbers. They consider how social interaction among users plays an important part in increasing switching costs that allow firms to appropriate value from their userbase (Subramanian et al., 2021). While the authors mentioned do delve into the user side of direct network effects, they still do not consider the impact of user heterogeneity on performance. They do, however, support the notion that the user side of the equation has more to offer than just the benefits derived from userbase size. This paper takes a look at a different dimension of users: their differences and argues that this difference matters. The utility that one user gains from the network when another user joins cannot be distilled into a  $1 + 1$  equation nor can user heterogeneity simply be assumed away with no significant impacts on growth performance.

## Chapter 3. Theory Development

### 3.1. Skill & Knowledge Heterogeneity

One area of research has documented the differences among

individuals and thoroughly explored its potential to improve firm performance: human capital. Human capital encompasses an individual's various attributes including intelligence, knowledge, skills, experiences, and expertise to name a few (Bontis et al., 1999; Davenport, 1998; Armstrong, 2006). Among the literature that documents human capital, I draw from the literature on certain individuals denoted as "stars" who have significantly higher contributions to their organization (Wright, Coff & Moliterno, 2014). A number of researchers have found that the presence of star scientists increases the productive and innovative performance of the firms they belong to (Hess & Rothaermel, 2007, 2011; Kehoe & Tzabbar, 2015; Zucker & Darby, 1997). Hess and Rothaermel (2011) found that they do so as they have disproportionate access to knowledge in their field since they often hold key knowledge themselves and are part of a broader community that allows them access to an even larger reservoir of such knowledge. They are also at the forefront of many activities which means that they are more informed about the latest news compared to the general public.

While the literature has proven the relevance of human capital among different individuals and its effect on firm performance, most work has done so within firm boundaries. Scholars that do consider agents outside of firm boundaries have focused largely on complementors and not users. This paper extends this view beyond these boundaries and argues that the participation of valuable users on a platform holds the potential to increase user engagement. When knowledgeable users share by posting

on a platform, other users can enrich themselves with deeper knowledge. Take for example users in an online community of passionate cooks. Among these aspiring cooks, a chef with over 20 years of experience uploads posts on their top tips and demonstrative videos on cooking techniques. It is easy to see how the presence of such an individual would contribute to the learning of the community disproportionately compared to an amateur just starting out. Additionally, users may also learn about the latest events in a field. Recently, Elon Musk has been making headlines after sharing his interest in acquiring Twitter. This sparked the interest of many especially shareholders of Tesla as it was expected he would sell Tesla shares to fund the takeover (BBC News, 2022). During this time, many have turned to Twitter as Elon Musk himself has been using his Twitter account to post updates (BBC News, 2022). The sheer presence of this key individual alone would attract thousands if not millions to the platform. Thus, the presence of this knowledgeable individual increases the value that a user derives from the platform. Following this, it is proposed that:

*Proposition 1: The presence of users who are more skilled and knowledgeable about their domains may lead to higher user engagement on a platform.*

### 3.2. Fame & Influence Heterogeneity

Another attribute that users may differ is in their fame and



influence. Here, we use the dictionary definition of fame which refers to “the state of being known or talked about by many people, especially on account of notable achievements” (Oxford Languages, n.d.). This definition includes those who are world-renowned (i.e. celebrities) and those who are known on a smaller scale to many (i.e. influencers, micro-influencers). There are a few ways that users who possess fame and influence could positively impact user engagement on a platform. Firstly, their presence may act as a signal about the quality of the platform through their affiliation. Support for this argument can be found in a line of research related to endorsements. Scholars in this field have found that famous and influential individuals such as celebrities have the ability to increase favorability toward a product when they show public support or approval of it (Bergkvist & Zhou, 2016; Carrillat & Ilicic, 2019; Erdogan, 1999; Knoll & Mattes, 2017). Just as the affiliation of a product and an individual of influence sends quality signals to others, the same may apply to the presence of such individuals on a platform. In fact, the effect of affiliation may be even stronger in such an ambiguous setting (Hubbard et al., 2018). This is because the reasons behind an influential user’s choice to use a platform are less clear compared to advertisements where their faces are explicitly pictured right next to the product. So far, this effect has not been tested in the context of platforms nor when the endorsement is indirect. However, it does provide support for the positive effects of affiliation with a famous and influential individual.

Secondly, the fame and influence of a user may send signals to

other users about their knowledge and abilities. As mentioned in the previous section, knowledgeable users are valuable to users on a platform. Indeed, a famous individual is not necessarily skilled or knowledgeable. However, as noted in the definition of fame, it is often thought to be possessed on account of some notable achievement (Oxford Languages, n.d.). People often perceive that fame is due to excellence in some ability such as acting or other superior attributes such as intelligence. The idea is that there must be a logical reason for someone to be known to many. And because fame and skill or knowledge often go hand in hand, fame acts as a signal to others that an individual possesses the potential to offer something valuable or interesting to learn. Additionally, what the “something” is does not have to be known or specific for it to have a potent effect. Their fame and influence also lend to making the individual appear more reliable and trustworthy compared to other users.

Thirdly, many of us are drawn to influential individuals. We observe multitudes being drawn to famous and influential individuals (Paul et al., 2019) and especially so on social platforms (Kim & Song, 2015). Because of some attributes they possess, they have the potential to attract new users and encourage current users to engage more frequently on a platform. As a case in point, the impact that Elon Musk had when he made an appearance on the Clubhouse app cannot be understated. During his appearance, the maximum cap of 5,000 listeners was quickly reached (Butcher, 2021). What followed was a stream of articles documenting this event and mass coverage of the app that led to countless people waiting

to obtain access to it (Sorrell, 2021). Following this, it makes plausible that:

*Proposition 2: The presence of users who are famous and influential outside of a platform may lead to higher user engagement on the platform.*

### 3.3. Gender Effect

In various facets of life, we see clear differences between those who identify as male and female. Of course, we observe differences in the physiological sense but we also observe differences in various cognitive functions like information processing (Venkatesh & Morris, 2000), motivation (Hoffman, 1972), and emotional awareness (Sun & Zhang, 2006), to name a few. Such differences often lead to different behavioral outcomes such as communication styles (Eckes & Trautner, 2012), adoption of technology in the workplace (Venkatesh & Morris, 2000), and playing games on social platforms (Muscanell & Guadagno, 2012). In this paper, such differences in outcome based on gender are referred to as the “gender effect.”

Related to social platforms, scholars have found a difference in the adoption of social media based on gender. For example, Hargittai (2007) found that women were more likely to use MySpace while Hargittai and Litt (2011) found that when controlled for media use, women were more likely to be Twitter users. Additionally, Muscanell and Guadagno (2012)

found that women reported more frequently posting public messages and photos as well as sending private messages and friend requests on Facebook and MySpace. While these papers have found a significant gender effect on social platforms, the effect has not been linked to the platform' s growth.

In this paper, I argue that female users have more potential to increase engagement on a platform compared to male users. This is because as shown above, women themselves are likely to join a network and engage actively in it (Muscanell & Guadagno, 2012). Making up a significant portion of the platform, their sheer presence would certainly increase overall user engagement. Furthermore, women were found to be more likely to be influenced by norms and reciprocity on a knowledge-sharing platform (Chai et al, 2011). This may lead women to post, comment, or like more when others engage with them as a gesture of reciprocation. Likes and comments are particularly important as they provide positive reinforcement (Kim et al, 2020) that encourage users to continue using a platform.

While women are more influenced by their environment in comparison to men, men are not invulnerable to being influenced. One particular outcome of influence is of interest: mimicking others. Kuang and colleagues (2019) found that following financially incentivized user engagement on a platform, the overall user engagement on the platform increased even after the financial incentives were taken away. This was true regardless of gender and shows our mimicking nature even on

platforms. Therefore, having women who are more active on a platform may help catalyze a positive feedback loop where users mimic the posting behavior that they witness. In time, this continued interaction will help to build a norm and culture of sharing and engaging with others that lead to an overall increase in user engagement. Therefore, I propose that:

*Proposition 3: The presence of female users may lead to higher user engagement on a platform compared to male users.*

### 3.4. Activity Level Heterogeneity

Even among knowledgeable, famous, influential, and female users, there are disparities in their impact on user engagement. One particular disparity is their desire to contribute to a platform reflected in their visible levels of activity. While users represent valuable input to a platform firm, since they are not employed by the firm, the consistency of their outputs cannot be guaranteed. In this case, the output of users refers to their posts, comments, likes, and any activity publicly seen by other users. Users will upload and engage on a platform based on various factors at their own discretion and this presents a problem for the platform firm. This is because a user needs to upload posts for others to gain any value from them. If a user is mostly absent from a platform, then regular users do not have the chance to gain knowledge and useful information no matter how skilled and knowledgeable one may be. The same applies to users who are famous and influential as well. If they do not upload any posts, other users

gain no benefit from the mere existence of their inactive accounts. In line with this, previous research has found that when a celebrity is more present on a platform, higher user engagement follows (Kim & Song, 2015).

As outlined in the previous section, the argument that female users have more potential to increase user engagement compared to male users rests on their individual activity levels. Firstly, if a female user is inactive, then she cannot contribute to engagement levels directly. Secondly, if they are inactive, then they will not reciprocate even if other users engage directly with them. This brings an end to any potential string of activities between two sets of users. Thirdly, since inactive female users do not engage in activities that can be seen by others, they do not contribute to the jumpstarting of the positive feedback loop.

Essentially, if valuable users themselves are not active, it is equivalent to them not being on the platform at all. It follows that the positive impacts on user engagement mentioned in propositions one to three are moderated by a user's public individual activity levels.

*Proposition 4: The effect of the presence of users who are more skilled, knowledgeable, famous, influential, and female will be moderated by their visible individual level of activity on the platform.*

## Chapter 4. Preliminary Study

### 4.1. Case Study Approach

A longitudinal, single-case study approach is used to understand how key attributes such as knowledge and skill, fame and influence, gender, as well as individual levels of activity may affect user engagement as an indicator of platform growth on the social investing app, Coffee House. This approach is suitable as it allows a thorough micro-analysis the mechanisms that allow other users to gain value key individuals that may encourage their engagement on a platform. Such magnified analysis of users and their activities is not only hard to come by, it is also necessary to obtain a deeper understanding that is difficult to achieve through multiple cases or large sample statistical studies (Ozcan et al., 2017). As in all case studies, I use a form of purposive and strategic sampling in my case selection (Korzilius, 2010). In line with the rationales outlined by Robert Yin (2003), Coffee House was chosen as the provision of nearly complete data on platform users provides an invaluable opportunity that has not been accessible to researchers before. The longitudinal nature of the data also allows an in-depth understanding of the complex phenomenon across time from the conception of the platform to the present.

### 4.2. Research Context

Coffee House (Korean: 커피하우스) is a peer-to-peer stock

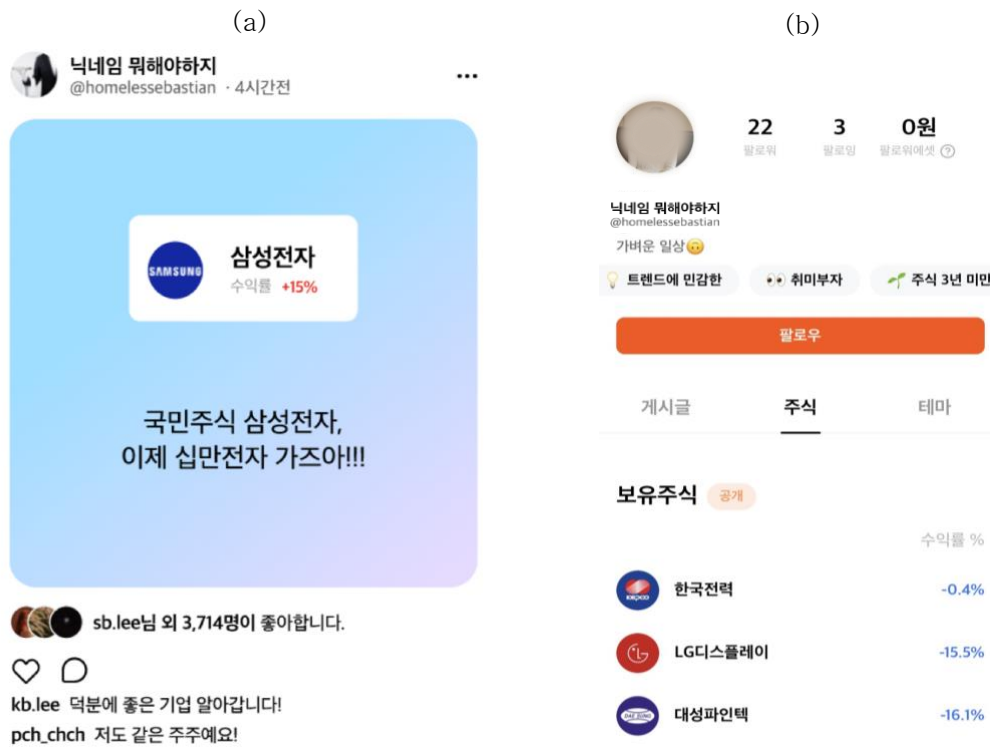
trading app and social platform. The social investing app was launched around the first week of November 2021. The platform was developed to create a one-stop shop for individuals interested in stock trading to acquire information, trade, and network with one another. Accordingly, it is characterized by learning activities such as knowledge seeking and sharing. In addition to stock trading, users can share posts, photos, and links to articles on a community page. Figure 1 (a) presents an example of such posts. These are seen by other users who gain value from other users as they learn new information about stock investing. They can interact directly with these posts by liking and commenting on them. Users can also click on each other's profiles (shown in Figure 1 (b)) where they can follow the user or view various items such as their recent posts, a short description, their tagged interest, their liked stocks, and stock portfolio. Overall, the community interface available can be pictured as a combination of Twitter and Instagram. However, Coffee House differs slightly in that users are able to filter the type of posts they want to see according to popularity, who they are following and recency which is the default option. In such a context, user attributes such as knowledge, activity levels, fame, and influence all play important roles in adding to the overall value the platform has to offer. This makes Coffee House an ideal setting for a preliminary study to obtain support for the theoretical framework proposed that is grounded in extant theory and to discover new insights that are grounded in the empirical data.

In addition, Coffee House makes the ideal setting for my study for



a few practical purposes. Firstly, because it is a relatively young platform of less than 6 months old, data detailing every step in the platform's growth from its inception to the present can be obtained. Secondly, data on user attributes such as their interests, experience, influence, and gender were able to be obtained. Given the sensitive nature of privacy in regards to personal data in this age, such extensive data on user demographics on a platform is invaluable. Thirdly, the setting allowed for the construction of the observational dataset specific to this study. This proves to be valuable as reliance solely on archival data that was not collected for research purposes may complicate its interpretations (Salganik, 2018).

Figure 1. User interface of Coffee House



## 4.2. Data Sources

It is important to triangulate multiple sources of evidence for construct validity (Yin, 2003). In order to do so, both primary and secondary data sources are utilized including: (a) observational data on activities of key users that are publicly available to all users using the platform such as posts and comments; (b) data on user attributes and other indicators of platform activity provided by the developing firm; (c) interviews with the firm CEO; (d) various other archival data including news articles, presentations, blogs, and app user reviews.

By combining several sources of data, we are not only able to view the platform from multiple different perspectives. Through the observational data of user activity, we see through the perspective of users who have already joined the platform of the firm. We are able to see their reactions towards the presence of users who possess key attributes whose identification is only made possible through the provision of demographic data from the platform firm. These insights are then complemented with the perspective of the firm obtained through the interview with Coffee House' s CEO and also with the perspective of potential users who have not joined the platform yet obtained through sources external to Coffee House such as blogs and app reviews. Together all these sources allow the construction of a more wholesome framework and also opportunities to gain fresh insights that may not be

obvious with theory alone.

### 4.3. Indicators of Interest

Assessing the propositions outlined in the framework involves identifying users who are: (a) skilled and knowledgeable; (b) famous and influential; (c) female. To identify female users, demographic data will simply be used. As for users who are skilled and knowledgeable, one feature that Coffee House includes is the self-tagging feature that allows users to voluntarily tag their profiles with various interests and information about themselves. Figure 1(b) displays some of the tags that a user has access to. Two tag options indicate the number of years of experience one has with stock investing; namely “less than 3 years” or “more than 10 years.” In this study, users who tag themselves with more than 10 years of experience are considered skilled and knowledgeable in the stock investing domain. Next, as mentioned, famous and influential users include micro-influencers. During the research period, the developing firm sponsored several micro-influencers to join and engage on the platform by uploading posts. The developing firm also provided a list of these micro-influencers to help identify them.

In addition to the identification of key users, indicators of user engagement and individual user activity must also be identified. In this paper, the main variable of interest is user engagement which is indicated by the daily active users (DAU) and monthly active users (MAU). DAU refers to the number of unique visitors who have taken action on the

platform on a daily basis. On the other hand, MAU refers to the number of unique visitors who have taken action on a monthly basis instead. For the data where daily information was available, I excluded data on the weekends as banks and therefore the stock market is closed on weekends. Since the platform relates to stock trading, it was expected to see dips in activity due to this. This was found to be largely true for many weeks.

Additionally, in proposition 4, it was proposed that the potential effect of users who are skilled, knowledgeable, famous, influential, and female on user engagement is moderated by their individual level of activity. Their individual level of activity is distinct in that it does not refer to the total activity on a platform, but that of a focal individual. Here, it is indicated by the number of posts by these key users. Only posts were chosen as they are very visible while comments and likes are not as visible comparatively. Using this indicator would decrease the likeliness that their activity is missed by others. This is in line with my argument that if other users do not see the output of the key users, then they do not have the opportunity to gain value from them.

## **4.4. Methods of Analysis**

As this study is a single case study, statistical analyses cannot be carried out. Instead, I identify patterns in the data that bear insights into the questions of: (a) do they find certain users more valuable than others and; (b) does this encourage them to engage on a platform more often. The number of daily active users (DAU) and monthly active users (MAU)

that are the indicators of user engagement are compared to the individual posting activity of key users based on the attribute of interest. Seeing exponential increases in the user engagement indicators compared to its baseline activity with the presence of key user activity will lend support to the propositions outlined. I also analyze the interviews and other archival data to identify themes that encourage user engagement. I focus on factors related to users themselves as opposed to functional features of the platform. All insights are then triangulated, integrated, and presented in the next section.

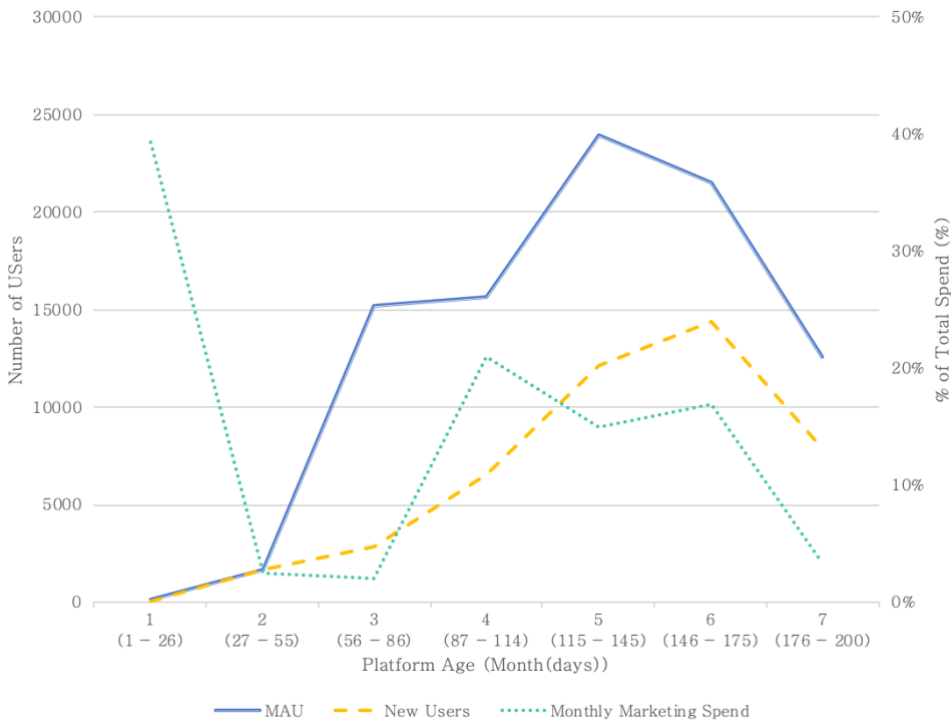
## Chapter 5. Results

### 5.1. An Overview of the Platform

We begin with a bird's eye view of the platform. Figure 2 provides an overview of user engagement trends indicated by the MAU alongside the number of newly acquired users and the platform's marketing spending on a monthly basis. The first thing that may catch your eye is the spike in marketing spend in the first month. This was due to high advertising video production costs. Aside from that, the marketing spend appears to be lagging behind the MAU as one would expect. We also see that the trend of new users seems to follow the MAU closely. This seems to indicate that newly acquired users make up a significant proportion of the number of users that are active when viewed from the more zoomed-out monthly basis. With marketing

playing a large role in attracting new users to a platform, it is reasonable to assume that marketing expenditure may explain some of the trends we see in the MAU. With that being said, it is not a perfect relationship which indicates that there are other forces at play that is driving user engagement on the platform.

Figure 2. MAU, Marketing Expenditure and New User Trends.



## 5.2. The Potency of Visibility

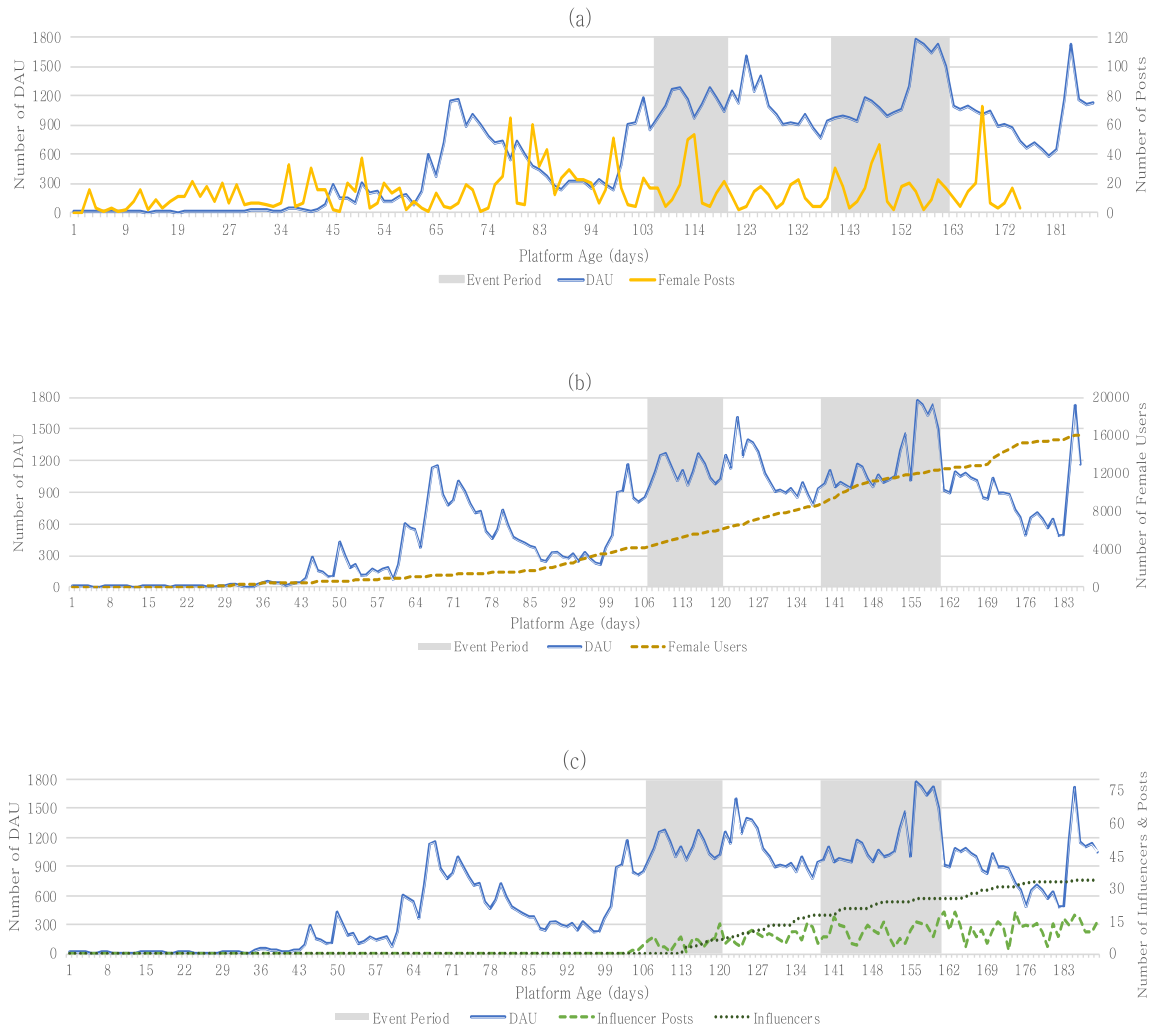
Now, we turn to uncover these other potential factors. Coffee House' s CEO Dongyeop Han provides us with a clue to the first potential force. Han revealed that in social networking sites such as Coffee House, it is crucial to have users form social networks as quickly as possible. This is because of the role that it plays in encouraging users to return and engage actively on the platform. While he acknowledged the importance of recommender algorithms in doing so, he also pointed to users' "attractive" qualities that are displayed on their profiles and their posts. He states, "In order for social networks to be formed, there must be voluntary relationships among users. In order for a particular user to follow/add friends, they must be attracted to other users' profile pages." Of course, the profile page itself is merely a tool for users to display their skills, interests, personalities, and other attractive traits. The page itself does not make users who do not possess these qualities attractive. However, these tools in the form of profiles and posts allow users to show off their attractive and valuable qualities. This provides some support for my argument that while the presence of users who possess valuable attributes is important, the amount of value other users can obtain from them is highly reliant on the amount of visible activity available.

We see a similar echo of this statement in the longitudinal numerical data. Figure 3 compares the trends between the DAU and the presence of key users across time. The gray area in the graph indicates

periods where promotional events were carried out by the platform. The presence of key users is based on two measures: 1) the existence of their accounts and 2) the number of their posts. Specifically, Figures 3(a) and (b) look at female users and Figure 3(c) looks at influencers. In Figure 3(b), we see that the presence of female users denoted by their accounts steadily increases over time. This is in contrast to the DAU which goes up and down with a few prominent peaks and valleys with a notable overall increase after the 100-day mark. Similar to the DAU, the number of female posts follow a similar up and down pattern but without an overall increase after any particular day. We see a similar pattern for influencer accounts and their posts in Figure 3(c) as female users. These trends suggest that the presence of female users and influencers denoted by the mere existence of their accounts does not move with the DAU. As for female and influencer posts, results are inconclusive as it seems to move together with the DAU at some points and differently at other points. Taken together, however, it is clear that the mere existence of the accounts for users with valuable attributes is not enough to increase user engagement. This lends some support to proposition 4 which states that the presence of key users indicated by their accounts is mediated by their individual level of activity.



Figure 3. DAU Trends Against Key User Posts and Accounts

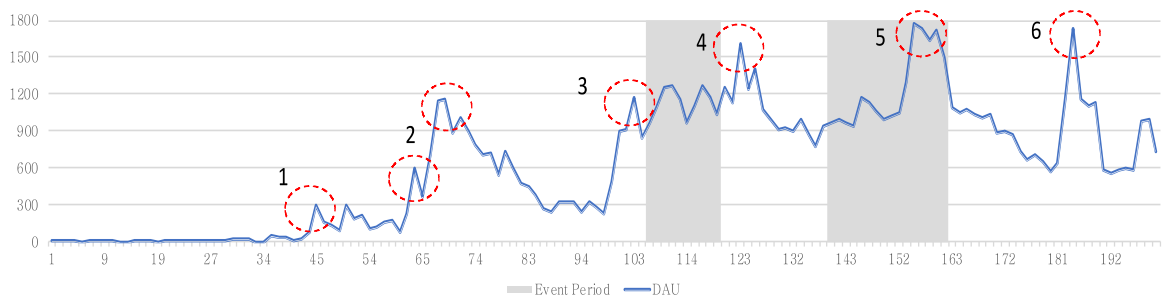


### 5.3. The Potency of Attributes

To get a closer look at the relationship between specific key user attributes and user engagement as well as make full use of the longitudinal nature of the data available, I compared trends for periods that were

identified as peaks in platform activity. Figure 4 indicates 7 peaks that were selected to be analyzed more closely. Specifically, where a peak in DAU was found, I analyzed the 7 days surrounding that peak. To identify a peak, I calculated the percentage increase in DAU of a particular day compared to the 3 days before and after it. I then selected a peak if it was in the top 5% compared to all other days in the study period. This resulted in peaks 1, 2, 4, and 7 being chosen. I identified peaks where I found the top three highest levels of DAU. Since one of these peaks coincided with the peak identified earlier (peak 6), I included only two additional peaks 4 and 6. I'd like to point out that in peaks 2 and 5 since two peaks coincided within the 7-day window, they were combined into one graph.

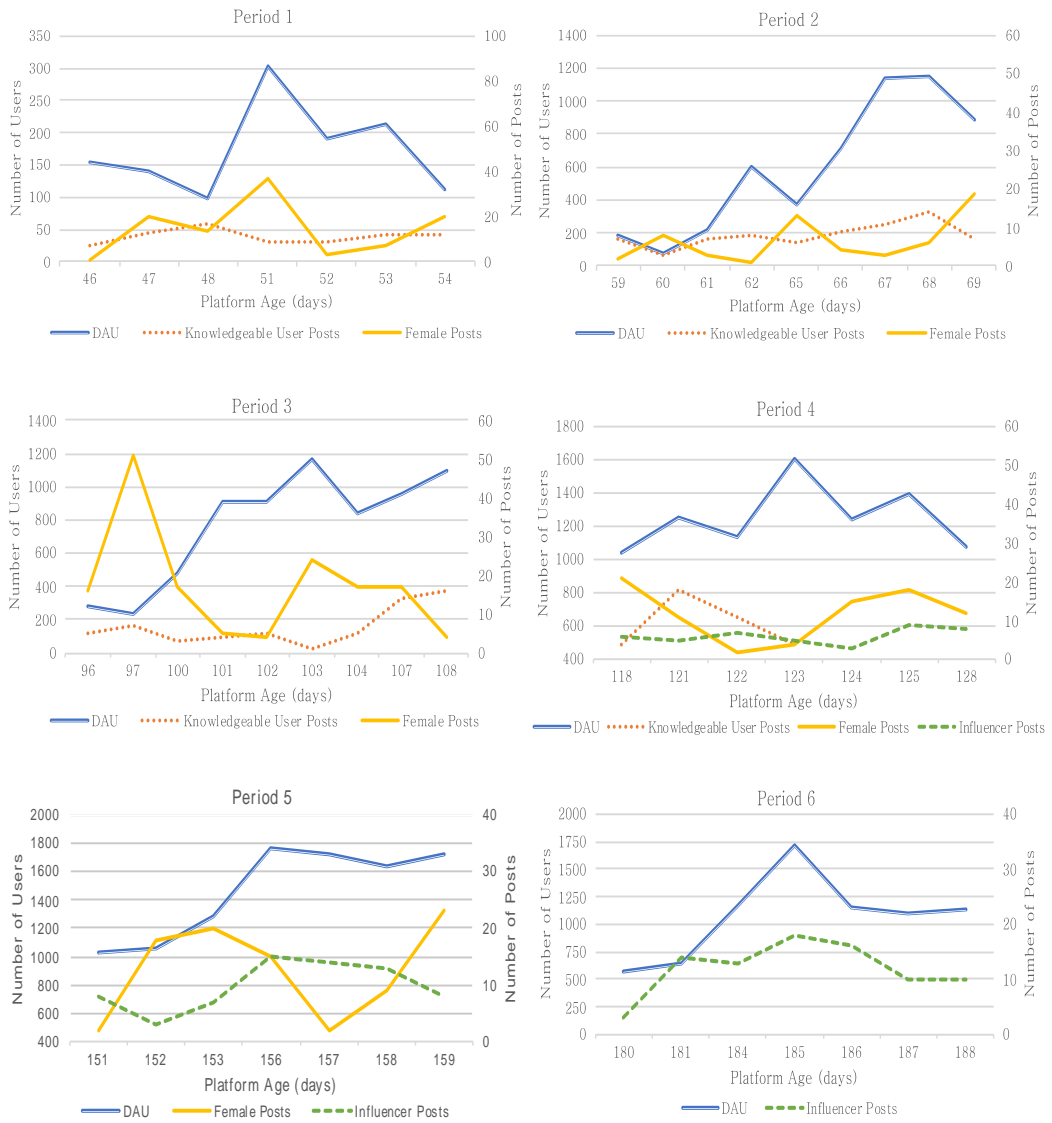
Figure 4. Identification of Peaks Analyzed.



The detailed breakdown of the period surrounding each peak compared to the posts of the individuals of interest is found in Figure 5. The complete posting activity data for all groups of users with the attributes of interest was not available for the whole study period. Therefore, some periods consist of only two (or one for period 6) groups. Moving forward, at a glance, it appears that the trends in the

posting activity of the key users follow the DAU slightly. For all periods in Figure 5, I find that the changes in knowledgeable users, influencers, and female users' posting activity follow the changes in DAU for 50.0%, 60.0%, and 67.00% of the time respectively. Posting trends in periods 1 and 6 follow the DAU most closely. On the other hand, there were periods where for a few days, the changes in posting activity and DAU seem to be opposites. One interesting example is period 2 where not a single day is out of alignment for knowledgeable user posts while many days did not align for female user posts instead. Overall, while in more than half of the instances posting trends for all key users tended to follow the number of DAU, this was not so for around 30–40% of the time for knowledgeable users and influencers and 50% for female users. This seems to indicate support for propositions 1 and 2 where I argued that the presence of users who are knowledgeable and influential respectively may encourage users to engage on a platform more frequently. However, the results seem to be unsupportive of proposition 3 which is related to the activity of female users. With that being said, for every instance, the posting activity level of at least one group was in line with the DAU trends.

Figure 5. Detailed Breakdown of Identified DAU Peaks



Similar to the peak analyses, existing users and potential users indicate support for the positive effects of the presence of knowledgeable and influential individuals while support for the presence of female users is lacking. Particularly, in the app reviews and news articles, there were a few recurring ideas and themes that relate to knowledgeable users. The

sentiment that kept appearing among users was how they valued being able to obtain stock-related information from other users. As one user puts it, “I like the platform because people share related news that I didn’ t know about previously and other information easily.” Seeing that the content available is generated by users, having users who are knowledgeable in the field share undoubtedly adds to the pool of valuable information. Adding further support for knowledgeable users being valued on a platform comes from the CEO of Coffee House. In a news article interview, he mentions that, “It is difficult for stock beginners to analyze stocks with charts like experts.” In fact, this is not unique to only stock investing but common to the learning phase in all domains. Having knowledgeable users who can break information down in an easily understandable way will prove to be valuable to those less knowledgeable in a domain.

In support of the presence of influencers being valuable, I found multiple individuals who voiced their desire to join the platform after reading external blog posts written by micro-influencers. One individual said, “Wow, I have to try this right away. Saved.” This provides support for proposition 2 where it was argued that having influential users outside a focal platform may attract new users thereby increasing user engagement. Another way that influential and famous users can increase user engagement is by encouraging those who already joined the platform to become more active on it. I found supporting evidence for this as one user commented, “Oh, I actually already downloaded the app a few days

ago after watching their advertisement. They' re having an event? I have to be more active on it over the weekend.” Because of the influence that the micro–influencer has outside of Coffee House, they were able to spread information about the focal platform on another platform and therefore encourage user engagement.

Reasons why can be found in my interview with CEO Han. Keeping in mind his statements on the importance of users finding other users attractive through their posts and profile pages, he points to an obstacle to this. There is a dilemma in the mind of users where on one hand, “there is a desire to see as much information as possible” and on the other, “there is a desire to reveal the least amount of information about themselves.” Because of this, a group of users are especially important to secure: users who like to reveal information about themselves. He further reveals that “It is necessary for these central users to form attractive profiles to become anchors in the social networks so that ordinary users can easily continue to expand their own networks.” According to Han, this is why many social networking platforms use the strategy to “seed” or bring on board influencers who are already established on other platforms. When asked about why he thinks this is so, his list of reasons included that it encourages other users on the platform to engage on it, they help attract new users from other platforms, and it significantly impacts the overall branding of the platform. His statements not only point to the importance of heterogeneity among users. They also support the argument in this

paper regarding those who are famous and influential outside of a platform.

## Chapter 6. Discussion

This paper looks at the relationship between user heterogeneity in various attributes and platform growth indicated by user engagement. Specifically, this paper draws from a wide range of literature and looks at skill and knowledge, fame and influence, as well as gender. I propose that users who possess these attributes can increase user engagement by increasing the value derived by other users on a platform. I conduct a single case study on the social investing platform Coffee House that details the lifecycle development from launch to the present. Through the proposed theoretical framework in section two of this paper, we explored how users possessing certain attributes can increase a platform's value offering, and therefore, user engagement that indicates growth. The potential mechanisms that allow these users to do so were also unpacked. This was paired with preliminary analyses of quantitative and qualitative data.

In my examination of the difficult-to-obtain, daily longitudinal data set recording user activities and attributes, I find some support for my proposition that the presence of users who are skilled and knowledgeable and female may increase user engagement. I find slightly weaker support for the same relationship in relation to micro-influencers. In Figure 5, there was not a single instance where not at least one

group' s posting activity followed DAU trends. However, we cannot be sure that the activity from one group was enough to explain the increase in DAU despite posting activity from other groups going in a different direction. I do not claim that the presence of individuals who possess desirable attributes is sufficient to explain all patterns in DAU levels. Some patterns may be due to unknown factors that I was not able to investigate in this study while others could be due to marketing and promotion efforts. For example, promotional events carried out during days 139–160 showed a noticeable increase in DAU, especially towards the end of the period. We also see an overall increase in DAU starting from day 100 which coincides with the month that marketing expenditure increased significantly.

Findings from the qualitative data seem to also lend support to propositions related to skilled and knowledgeable users as well as micro–influencers. I found evidence showing that micro–influencers were able to encourage new and current users to engage more on the platform. I also found users echoing the sentiment that those who can provide valuable information to a platform are highly valued by users.

## 6.1. Implications

The biggest implication and main contribution of this study is to the platform strategy literature. As platforms are growing in significance in our digital economy (Boudreau, 2017; Evans & Gawer, 2016; Parker et al., 2016), research related to network effects is becoming increasingly



abundant as well. Network effects is one of the fundamental properties of a platform. Network effects occur when the value offered by a platform increases when a participant, be it users or complementors, joins the network. This occurs as participants are attracted to one another in direct network effects or attracted to the other side in indirect network effects. However, extant work in the platform strategy literature has indirectly assumed that the impact of the addition of each participant is homogeneous. The framework and findings presented in this study challenge this assumption with a focus on direct network effects. In this paper, I argued that users are heterogeneous across various attributes and this can affect the quality of their outputs. Since in many platforms, these outputs are a large part of a platform's offering, this can increase the value that other users derive from the platform. Through cascading effects, this can then in turn affect platform growth. This study highlights only one way that the theoretical implication that all users are not the same can have significant impacts on a platform.

Another example is related to the characterization of the strength of network effects. Zhu and Iansiti (2019) noted that the strength of network effects can vary significantly across different platforms. They posit that when *network effects are strong*, then the value provided by a platform increases exponentially as the number of participants increases. They characterize video game consoles like the Xbox as having weak network effects because “video games are a hit-driven business” where “the total number of games isn't as important in console sales as

having a few right hits” (Zhu & Iansiti, 2019, paras. 8). The crux of their argument is that in this setting, an output’s quality is more important than its quantity, and therefore, network effects are weak. However, is this necessarily the case? If the *quality* of output matters more to users on a platform than the *quantity* of output available, does this mean network effects are weak? In order to answer this question, we need to go back to the definition of network effects.

As a reminder, network effects occur when the value offered by a platform increases when a participant joins the network. How they do so is not explicitly specified. While it is true that complementors and users can contribute to a platform by producing higher quantities of output collectively, the quality of the output produced by different individuals is certainly not all the same. Current interpretations of network effects theory focus heavily on a quantity perspective. It posits that participants increase the value offered as they produce more amounts of some type of output (i.e. content, video games, apps, physical goods, etc.). However, this only gives us a one-sided view of the phenomenon. Without considering the quality of the output and the heterogeneous participants who produce them, we cannot get the full picture of network effects. Network effects or the attraction among participants may still be strong if a certain quality offered by one party is highly valued by the other. Echoing this sentiment, in this paper, we see support for the argument that users are attracted to knowledgeable users who produce insightful and informational (high quality) posts (output). These illustrations

highlight the importance of embracing a broader interpretation of network effects to consider the size of the userbase *and* the different attributes that users possess.

This study also has a few practical implications for platform firms and their managers. Firstly, this study helps to better inform managers on how to allocate resources when acquiring users. Where a large part of a platform' s offering is dependent on users, perhaps resources are better spent attracting specific users that have been identified as valuable to the platform. Such individuals of course may differ on a case-by-case basis. In the case of Coffee House, such valuable users were identified as those who are skilled and knowledgeable, famous and influential as well as female. With limited resources in an increasingly competitive market, platform firms may be better off focusing acquisition efforts on these individuals instead of simply anyone and everyone.

In the earlier days of Amazon, they showed us how platforms can actively harness the power of their userbase. They did so by introducing the product review feature that allows users to contribute to the platform in the form of information and knowledge. This led to users coming back to the website to read these reviews and also write their own reviews. With the implications of this study, perhaps platform firms take heed of Amazon' s example and introduce features that enhance the ability of valuable individuals to contribute to the platform more effectively. One example of this is Tiktok and its introduction of the share to Instagram feature on the app itself (Taulli, 2022). This allowed users who were

influential on other platforms to spread awareness of TikTok and encourage the joining of new users.

## 6.2. Limitations and Extensions

The case study presented here is an initial attempt to understand how heterogeneous users in respect to various attributes affect their ability to contribute to a platform's value offering and, therefore its growth. Through the longitudinal in-depth data about the platform and its users, we were able to explore this relationship on a social networking platform. Given the limitations of this study, future research will need to dig deeper and potentially validate the theoretical framework and initial findings. Furthermore, as with all case studies, the generalizability of this study is limited to the specific setting studied here. Here, we studied a social networking site where the main value offered by the platform is reliant on users. With that being said, with participants taking on simultaneous roles of both complementors and users (Boudreau & Jeppesen, 2015), as well as platforms firms integrating a social side to traditionally non-social platforms, the lines in between are becoming increasingly blurred. Take for example a second-hand marketplace like Facebook Marketplace where users simultaneously list and buy items. This in combination with the initial findings and theoretical framework indicates promising avenues for future research.

As mentioned earlier, users who contribute to the value of a

platform' s offerings by producing higher quantities of output are only one side of the story. By taking into consideration the heterogeneity of users, we can further unpack the various ways users contribute to the value offered by a platform. This study only a handful of attributes that are important in this context. Further studies can look into identifying other potential user attributes and how this differs across different platforms. This paper also only explored the potential positive outcomes of users' varying attributes. There may be user attributes that could have negative effects instead as supported by the existence of internet trolls and bullies who exude anti-social behavior that has prompted the need for moderators. Future studies could look into identifying negative attributes as an extension of the present study.

Lastly, previous research has shown that social interactions on platforms increase switching costs for users allowing platforms to appropriate value and exploit network effects (Subramanian et al, 2021). The current study only examines the potential of certain user attributes on platform growth. It does not investigate the relationship of such attributes to other dependent variables such as switching costs. Future studies can look into the effects of the same user attributes on different areas of the platform and if there are potential interaction effects on already known factors.

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## 국문초록

빅테크기업과 유니콘 스타트업의 성공으로 최근 플랫폼 비즈니스 모델(platform business model)은 많은 관심을 받고 있다. 이러한 다방면의 플랫폼은 네트워크 효과(network effects)를 통해 다르지만 서로 의존하는 유저(users)와 협력자(complementors) 간의 상호 작용을 촉진하여 가치를 창출한다. 두 그룹 모두 중요하며 전체 플랫폼 생태계(ecosystem)에 기여하지만, 협력자에 대한 연구에 비해 유저에 대한 연구가 많이 존재하지 않는다. 또한, 대부분의 유저 관련 연구는 플랫폼 유저 수에만 집중한다. 본 연구는 유저를 자세히 살펴보고 기술, 지식, 명성, 영향력 및 성별과 같은 다양한 속성의 잠재적 영향을 탐구한다. 이 연구는 유저의 다양한 속성, 영향력 그리고 메커니즘을 고려하고 기존의 이론을 기반으로 이론적 틀을 제시한다. 이 조사는 초기 단계에 있는 소셜 플랫폼의 수치와 질적 자료 분석을 결합한 사례 연구(case study) 방식을 사용하여 이론적 틀을 뒷받침하고 데이터에서 새로운 인사이트를 밝힌다. 직접 네트워크 효과 이론'에서는 모든 유저가 플랫폼에 동일하게 기여한다는 가정이 존재한다. 본 연구는 이 가정에 의문을 제기하여 특정 유저는 플랫폼 성장에 다른 유저들보다 더 큰 가치를 기여할 수 있다는 점을 조사한다.

주어어 : 플랫폼, 유저 다양성, 네트워크 효과, SNS

학번 : 2020 - 29700