



The digital economy and the growth dynamics of sharing platforms: A transaction cost economics assessment



Yusaf H. Akbar^a, Andrea Tracogna^{b,*}

^a Department of Economics and Business, Central European University, Vienna, Austria

^b University of Trieste, Department of Economics, Business, Mathematics and Statistics (DEAMS), Trieste, Italy

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ABSTRACT

Despite their growing significance in the digital economy, some sharing platforms struggle to achieve sufficient scale, while others fail entirely. By extending the focus beyond network effects and trust-building mechanisms, this paper seeks to identify factors that impact platform growth and to analyze their implications for governance mechanisms and the strategic management of sharing platforms. We center our analysis on transaction costs economics (TCE) and its three key related variables: transaction frequency, transaction uncertainty, and transaction-dedicated investments. Our aim is to examine how these variables determine transaction costs at the platform level and how these costs shape member participation and hence platform growth. To explore our hypotheses, we surveyed a community of members of a digital, peer-to-peer (P2P) sharing platform. Our empirical findings confirm that a platform's growth is significantly affected by transaction features and that, alongside other theoretical approaches, TCE represents an appropriate and complementary lens with which to explore the growth dynamics of sharing platforms, as well as to consider appropriate actions platform owners can take at the organizational, governance, and strategic design levels.

1. Introduction

Digital platforms are powerful engines of economic activity (Evans and Schmalensee, 2016), and they may significantly reduce the costs of exchange and interaction (Parker et al., 2016). The rise of these platforms has stimulated an extended body of academic research (Rochet and Tirole, 2003, 2006; Eisenmann et al., 2006; Cennamo and Santalo, 2013; Hagi and Wright, 2015) and driven radical innovations in business models across a number of industries. In recent years, we have witnessed a widespread “platformania” (Yoffie et al., 2019), which looks like a “land grab, where companies feel they have to be the first mover to secure a new territory, exploit network effects, and raise barriers to entry” (ibidem, p. 3). However, despite the enthusiasm around digital platforms, their success is by no means assured or self-sustaining (Cusumano et al., 2020; Drewel et al., 2021). This is particularly true for sharing platforms driven by peer-to-peer (P2P) and collaborative sharing (Wirtz et al., 2019), which are an increasingly important subset of the digital economy and include accommodation (Airbnb), shared rides (Lyft), crowdsourced labor (TaskRabbit), and peer lending (Kickstarter), among other industries (European Commission, 2016), with their importance having been reinforced by the COVID-19 pandemic (CEPS, 2020). Besides a few “unicorns,” most sharing platforms appear to struggle with getting established and scaling while others fail entirely (Van Alstyne et al., 2016).

* Corresponding author. Dipartimento di Scienze Economiche, Aziendali, Matematiche e Statistiche (DEAMS), Università di Trieste, Via Valerio 4, 34127, Trieste, Italy.

E-mail addresses: AkbarY@ceu.edu (Y.H. Akbar), andrea.tracogna@deams.units.it (A. Tracogna).

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The extant literature identifies two sources of poor platform growth. The first is an absence of network effects (Katz and Shapiro, 1985; Evans and Schmalensee, 2010). Network effects may be defined as the advantages to platform members of adding other users on one or both sides of the platform (Parker and Van Alstyne, 2005). This process may activate a self-supporting dynamic (Arthur, 1989; Evans and Schmalensee, 2010) whereby scaled platforms drive marginal costs close to zero and generate a monopoly that is hard to contest by smaller existing platforms or new entrants, eventually leading to a “winner takes all (or most)” outcome (Cusumano et al., 2020). This self-sustaining mechanism is not just related to the number of platform users but also to the content of the sharing: while the sharing of physical assets is typically confined at the local level, thus limiting network effects to geographically proximate parties (i.e., the local level), when the shared asset and/or product are digital in nature, network effects can easily extend at the regional and global levels (Gawer, 2021). From this perspective, a platform’s lack of growth may be due to difficulties in first generating and then spreading the reach of network effects, thus preventing a tipping point where growth becomes exponential from being reached. A second source of poor platform growth is the (lack of) trust and trust-building mechanisms that support platforms as social networks (Buskens, 2002), online marketplaces (Gefen, 2000; Bart et al., 2005; Nosko and Tadelis, 2015; Tadelis, 2017), or interorganizational forms of relational exchange (Zaheer and Venkatraman, 1995). A growing platform requires a certain amount of social capital (i.e., trust) to facilitate interactions among lesser-known counterparts (the so-called marginal users). The absence of this inter-user trust reduces network effects and ultimately impedes the achievement of the tipping point. Under this explanation, a lack of platform growth can be attributed to underdeveloped trust-building mechanisms (McKnight et al., 2002).

The complementary perspectives articulated above have significantly advanced our understanding of what makes a sharing platform successful. Yet, while capturing important features of digital platforms, network effects and trust-building mechanisms can’t provide a full explanation of the platform’s dynamics, as other relevant dimensions of the platform-level economic exchanges and interactions remain uncovered. Given this reality, *our research aims to address the following two questions. What factors may impede the growth of sharing platforms? And what can be done by the platform owners—at the governance and strategic levels—to address these impediments?*

This study aims to examine sharing platform growth through the lens of transaction costs economics (TCE) (Williamson, 1979, 1985). Namely, we posit that the growth of a sharing platform’s growth depends on the very nature and features of the transactions it enables. This argument complements network effects and trust-based explanations in two respects. First, network effects arguments tend to reduce the issue of platform growth mostly to a matter of volumes of transactions (both in terms of numbers of platform members and of transaction density). Second, transaction costs extend beyond the lack of trust (and the consequent levels of behavioral uncertainty), as they are also influenced by environmental uncertainty and by the dedicated investments the parties need to make to generate economic value through sharing platform transactions.

Our research applies a fine-grained characterization of sharing economy transactions. We first assess how transaction features may generate transaction costs at the platform level (Williamson, 1979, 1985), and then we suggest how such variables can be actively and strategically influenced by the platform owner itself via specific *mechanisms of governance*. To explore this further, we develop an empirical model that relates sharing platform growth, proxied as the desired future participation in sharing platform activities, to our set of explanatory variables (transaction frequency, uncertainty, dedicated investments). We survey a community of members of *Miutcánk*, a P2P Hungarian sharing platform that, despite having been established and launched quickly, has been having difficulties scaling up, thus representing an exemplary case of the phenomena (P2P sharing platforms) investigated by our study. Our findings suggest that *Miutcánk*’s growth has been significantly limited by the transaction features, which in turn have impeded the full generation of network effects and the sufficient building of trust. In discussing the empirical findings, we derive some implications for platform owners, that is, we argue that the solution to platform inability to grow lies in the development of specific governance mechanisms that involve the transformation of the platform from a P2P form into an integrated one.

This paper is organized as follows. Section 2 is a literature review that considers three issues. First, it introduces the key antecedents of the sharing economy and sharing platforms. Second, it introduces core theoretical aspects of TCE, especially its main constructs (frequency, uncertainty, and specificity). Third, with a view to examining governance mechanisms, it positions sharing platforms as intermediate governance structures that are between markets and hierarchies. We then develop our hypotheses linking features of platform transactions to transaction costs and platform growth. The paper then outlines the empirical methodology of the study and presents and discusses the empirical results, deriving governance and strategic management implications for sharing platforms. A concluding section of our paper discusses its limitations and proposes further areas of research.

2. Transaction cost economics: a theoretical consideration of sharing platforms

2.1. The sharing economy and sharing platforms: key antecedents

The sharing economy can be defined as a set of business, production, and consumption practices that are fundamentally centered on the temporary use for free, or for a fee, of underutilized assets (Botsman, 2013). While these practices are very old, three aspects of current economic sharing are noteworthy: first, the exponential growth and use of digital platforms and devices; second, a rising interest in more sustainable use of consumer goods and services made available through sharing; and third, evolutions in consumers that focus on personal interaction and community engagement, especially in urbanized environments (PricewaterhouseCoopers, 2015). Bardhi and Eckhardt (2017) claim that the sharing economy is part of what they conceptualize as “liquid consumption,” a new dimension of consumption that is “ephemeral, access-based, and dematerialized” (Bardhi and Eckhardt, 2017: 585).

Building on the notion of sharing economy practices described above, Zeng et al. (2021) consider platforms a means by which sharing economy practices can flourish. This is due to mechanisms built on the platforms that coordinate the supply of capital and labor through peer-to-peer (P2P) transactions by decentralized crowds of individuals and typically small/independent businesses. Sharing

platforms allow users to grant each other temporary access in several ways, such as under-utilized physical assets (such as Airbnb, Blablacar, and Lyft) and freelancer skills with project work (such as TaskRabbit), but not always for money (Benkler, 2004; Bardhi and Eckhardt, 2012; Laamanen et al., 2016). Constantinides et al. (2018) suggest that sharing platforms have relatively low start-up costs, as they are typically supported by peer communities (Sánchez-Pérez et al., 2020). Moreover, sharing platforms do not require the kinds of investments in tangible assets that other platforms require. As sharing platforms become increasingly common venues for economic exchange (Horton and Zeckhauser, 2016; Parker et al., 2016), a central and salient role has been played by digitization and information technology (Spagnoletti et al., 2015), which have transformed services that hitherto required face-to-face interaction between supplier and buyer, while the boundary separating digitized production and consumption has become increasingly blurred: individuals can now rent out their own homes on Airbnb whilst renting someone else's on the same platform. This behavior has been termed “prosumption” (Tapscott and Williams, 2008) and “collaborative consumption” (Belk, 2014). Economic sharing that relies upon the deployment of a digital platform to facilitate it has three characteristics: it forms digital systems that use matchmaking algorithms to allow for transactions between users; it prioritizes temporary access over ownership; and it emphasizes the more efficient use of underutilized assets.

2.2. A TCE perspective on sharing platforms

With Ronald Coase's seminal research at its origin (Coase, 1937), TCE has been elaborated on through the celebrated work of Oliver Williamson (1971, 1975, 1979, 1985). From the TCE perspective, economic institutions such as firms and markets, and other hybrid forms (including digital platforms), arise as forms of economic organization that efficiently administer exchange activities in the presence of transaction costs. At the core of TCE are three variables that define the fundamental nature of economic transactions (Williamson, 1979): frequency, uncertainty, and dedicated investments (asset specificity). First, transaction frequency refers to the intensity of exchanges (occasional vs. recurrent) that occur among the same parties over a specific time span. Second, transaction uncertainty is related to the identity of the parties (exchange may sometimes occur between largely unknown counterparts) and to the transaction context, including a temporal dimension, as transactions may, at times, extend for long times and are repeated. Third, dedicated investments (asset specificity) reflect the extent to which durable, specific investments in economic assets (physical assets, intangible assets, time, etc.) are needed to optimize transaction value.

Transaction costs are determined by the specific combination of the three transaction features defined above and the nature of the economic agents involved. TCE generally assumes that participants in economic exchange are boundedly rational and must confront the risk of opportunism in their exchange counterparts. More specifically, a combination of dedicated investments required to complete the exchange and the risk of opportunism generate a problem of safeguarding the assets invested by the parties in the transaction to eliminate/reduce the risk of “hold-up” (Williamson, 1979). Bounded rationality and uncertainty pose, in turn, problems of adaptation of the transaction to the changing circumstances and of measurement of the actual identity (*ex-ante*) and performance (*ex-post*) of the involved parties. TCE further posits that the features of the underlying transactions determine the selection of transaction governance type: that is, economic agents determine the most efficient contractual arrangements (i.e., organizational forms) for administering transactions (i.e., for the governance of economic activities). These theoretical assertions have been widely confirmed by empirical studies (Rindfleisch and Heide, 1997), which have established that transaction-level features have a significant influence both on contracting and governance selection, as well as on organizational functioning and endurance of economic exchange (Macher and Richman, 2008; Argyres and Zenger, 2012).

From the perspective of TCE, sharing platforms are hybrid governance structures that challenge vertically integrated firms and are a departure from typical market mechanisms (Akbar and Tracogna, 2018). Sharing platforms can be compared to markets and hierarchies under a set of dimensions directly derived from TCE and including: the *contract form/normative basis* (Powell, 1990), where sharing transactions take their origins from forms of neo-bartering (Belk, 2014); the *scope of exchange* (Macneil, 1978), which involves two parties with the exchange mediated by the platform owner; the *identity of the parties*, (Macneil, 1974: 738), which is only partially relevant in a sharing transaction because the platform owner, acting as the intermediary of exchange, often supplements the parties' reputation to facilitate the encounter; the *means and intensity of communication* (Powell, 1990), with communication channels on a platform typically being managed by the platform owner, which promotes information exchange among users and encourages community-building activities; *transaction length*, which depends on the type of asset to be accessed, the user's needs and other exchange conditions; *monetary incentives* (prices, commissions, margins, etc.), which in a sharing context do not represent the only motivations for exchange. Indeed, platform users, as well as the platform owner, may often respond to non-monetary incentives, which in turn may be reflected in a users' ethical considerations (such as a belief in an economy less dependent on profit-seeking and ownership) and sense of belonging to sharing communities, including the desire to adopt forms of pro-social behavior in alternative marketplaces (Albinsson and Yasanthi Perera, 2012); and finally, *control mechanisms*, which the platform owner incorporates in order to govern platform exchange (Ouchi, 1979). Table 1 summarizes the key dimensions of sharing platforms as hybrid forms.

In this study, we further break down sharing platforms into two specific types of hybrid forms, depending on the prevalence of market or hierarchical features. One type of platform, which is closer to a market form, is the P2P sharing platform, while the other, which incorporates more hierarchical mechanisms, is here called the integrated sharing platform. This dichotomy is important for understanding how sharing platforms transition from one to the other to sustain growth. It makes intuitive sense that P2P sharing platforms aim at broadening their scope of activities if, for no other reason that by doing so they achieve the tipping point that allows for self-generating network effects (Cusumano et al., 2020). Yet, such increases in the volume of platform transactions lead, in turn, to more challenging governance issues. Indeed, due to a “death of distance” effect (Tranos and Nijkamp, 2013), platforms commonly follow a particular dynamic: on the one hand, the inclusion on the platform of distant (marginal) transactions (members) allows for an increase of transaction volumes and to positive network effects. On the other, as the number of new platform members rise, the effectiveness of

Table 1
Key features of sharing platforms as hybrid governance mechanisms.

Dimensions	“Pure” Market organization	Hierarchical organization	Sharing Platform organization
Contract form/ Normative basis	Classic, complete, arm’s length contract (spot) transactions	Employment contract, internal conflict resolution, forbearance	Neo-bartering and platform contracts
Scope of exchange	Bilateral	Vertical, multi-lateral, with one common party	Bilateral, mediated by the platform
Identity of parties	Irrelevant	Relevant	Partially relevant, with mechanisms of trust-building

platform-wide trust-building mechanisms (e.g., ratings, reviews), which are typically crowdsourced to sharing platform members (Kuan and Lee, 2019), decreases due to associated increases in transaction uncertainty (as transactions become more marginal). Reduced levels of reputation and trust lead to higher perceived risks in participating in sharing platform activities and to higher expectations of opportunistic behavior on the part of other platform members. In some cases, this discourages members from making the necessary specific (dedicated) investments required for successful platform interaction and exchange. The result is that unless specific strategic actions are taken by the platform owner, sharing platforms get stuck in a situation where higher transaction costs caused by their growth (i.e., higher uncertainty and dedicated investments required) cannot be fully offset by the positive network effects generated by the increasing number of members and of transactions.

In the following section, we derive a set of hypotheses on the specific nature and direction of the associations between a platform’s transaction features, transaction costs, and platform’s growth. Our hypotheses relate (via both direct and moderating effects) platform growth (proxied as a participant’s desire to participate in the future in a platform’s activities) to the three canonical features of transactions from the TCE perspective: frequency, uncertainty, and dedicated investments. Once the association between platform growth and these three features has been ascertained, we will derive, in the final part of the paper, a set of strategic implications for platform owners to overcome the obstacles generated by excessive transaction costs.

3. Development of hypotheses

It is noteworthy that our application of TCE to sharing platforms does not focus purely on the dyadic (i.e., single transaction) level but also on the platform (network) level. Williamson himself (1996) argued that TCE lends itself to network arguments, an idea which he had articulated a few years before (Williamson, 1985) by noting that TCE “(...) normally studies each trading nexus separately, and though this is (...) useful for displaying the core features of each contract, interdependencies among a series of related contracts may be missed or undervalued as a consequence.” (Ibidem, p. 393). It is then under this dual perspective (dyadic and platform-level) that we are now deriving our set of hypotheses, linking transaction features with the platform’s growth.

3.1. Current transaction frequency

Our first hypothesis concerns transaction frequency. From the perspective of a platform member, transaction frequency depends on transactions being repeated both with the same parties and with different platform members. According to network economics (Katz and Shapiro, 1985; Arthur, 1989; Schilling, 2009), the volume of exchanges and interactions one member generates with other members of a platform is central in the generation of network effects (Parker and Van Alstyne, 2005). In particular, the utility a platform user derives from membership increases with the number of transactions he/she carries out with fellow platform members (Hinz et al., 2020). This is fully consistent with a TCE perspective: when a member of a platform is already active on the platform and her current transaction frequency is high, so is her propensity to further participate in activities on the platform. In line with the above, we posit that high pre-existing levels of transaction frequency encourage members to further increase their level of activity on the platform, thus igniting platform growth. Thus, our first hypothesis is expressed as follows.

H1. The higher the current member participation in platform activities (transaction frequency), the higher the desire to further participate in platform activities.

3.2. Transaction uncertainty

Under the conditions of opportunism and bounded rationality, TCE asserts that uncertainty increases transaction costs. Anderson and Schmittlein (1984) distinguished between environmental uncertainty and behavioral uncertainty. While behavioral uncertainty originates in unpredictable partner performance, environmental uncertainty is associated with “unanticipated changes in circumstances surrounding an exchange” (Noordewier et al., 1990, p. 82), including demand levels, technological dynamics, and supplier quality. Both types of uncertainty have negative consequences for platform growth dynamics. As a P2P sharing platform grows, new transactions involving new and unknown parties (the marginal transactions) become highly uncertain for both behavioral and environmental reasons. Thus, increases in platform size may generate higher levels of transaction uncertainty, with negative consequences for sharing platform members’ attitudes regarding being active on the platform. In general, platform members facing and/or expecting high transaction uncertainty will be less inclined to increase their levels of participation on the platform. Thus, the following hypothesis is derived.

H2. The higher the uncertainty of transactions taking place on the platform, the lower the desire to participate in platform activities.

3.3. Dedicated investments

Our third hypothesis concerns dedicated investments. From a TCE perspective, an important aspect of economic exchange is predicated on dedicated investments (asset specificity), which can be defined as the degree of transaction-specific (non-marketable) expenses (investments) incurred by the parties of a transaction (Williamson, 1979). Due to difficulties recovering the cost of such investments, parties may be reluctant to use specialized assets in platform transactions, thus limiting their sharing activities. There are numerous forms of dedicated investment, including site specificity (e.g., physical proximity between contracting parties), product complexity, inter-firm co-specialization, and spatial or temporal proximity (Macher and Richman, 2008). *Ex-ante* and *ex-post* dedicated investment requirements play opposing roles in our TCE-based explanation of platform dynamics. *Ex-ante* investments increase a party's commitment to the sharing platform, as they will seek to 'amortize' their pre-existing investment in specific assets. For example, sharing platforms may be populated by 'professional' members, who own and share assets they do not use by themselves and that have been, *ex-ante*, fully dedicated to the sharing platform. Required *ex-post* investments, in turn, reduce the willingness to participate in platform activities, due to the risk and uncertainty associated with making an investment that 'may not pay off'. In other words, in the case of past dedicated investments, sharing platform members have a clear incentive to continue participating in the sharing platform to recoup the investments made (*ex-ante*). By contrast, if members are expected to make dedicated investments in the future (i.e., *ex-post*), this represents an impediment to sharing platform participation, particularly when the assets to be invested have a low value when not shared on a sharing platform (e.g., rooms or apartments in the case of Airbnb; car use in the case of Blablacar or Über). This has negative consequences for future platform growth, as transactions may be limited due to a lack of dedicated investment. As our study focuses on the future evolution and dynamics of sharing platforms, we focus our attention on *ex-post* investments, leading us to the following hypothesis.

H3. The higher the need for future (ex-post) dedicated investments in platform transactions, the lower the desire to participate in platform activities.

3.4. Moderating effects

In line with Mayer (2009), we argue that not only do transaction cost features impact sharing platforms individually, but these same features also interact with each other. We focus specifically on the moderating role played by transaction frequency. When transaction volumes (frequency) are high enough, even transactions characterized by high levels of uncertainty and high-risk dedicated investments may become attractive because the platform member may compensate for the losses incurred in some transactions with the gains obtained in others. Therefore, we posit that higher levels of transaction frequency on a sharing platform may alleviate the negative impact of uncertainty and ex-post dedicated investments on overall transaction costs. Thus, we hypothesize the following.

H4. Current transaction frequency counterbalances the negative relationship between transaction uncertainty and the desire to participate in platform activities.

H5. Current transaction frequency counterbalances the negative relationship between the need for future dedicated investments and the desire to participate in platform activities.

3.5. Cross-side frequency

We posit that a member's transaction frequency on one side of the sharing platform has the effect of increasing his/her participation on the other side of the platform. For instance, as platform members increasingly benefit from the information shared on the sharing platform, it can be expected that they will be more willing to contribute by sharing their own information with other platform members; further, if they keep borrowing objects on the platform, we can expect, in turn, that they will be more willing to lend their objects via the platform. In sum, we assume that members of a sharing platform may prefer to be active on both sides of the platform simultaneously, thus increasing their overall level of participation in platform activities (Ondrus et al., 2015; Chu and Manchanda, 2016). This cross-side frequency effect is to be considered central to our TCE-based theoretical model of sharing platform growth. Indeed, particularly in early-stage sharing platforms, due to their P2P nature, it is natural to expect that the desire to participate in the platform activities is also driven by a sort of "giving-back" attitude, that is, the more a user is active on (and thus benefits from) one side of the platform, the more this user will be willing to participate on the other side of the platform. This is because sharing platforms are often driven by non-monetary incentives and collaborative purposes, which go beyond pure economic exchange. The following hypothesis is thus derived.

H6. The higher a member's transaction frequency on one side of the platform, the higher their desire to participate in the activities on the other side of the platform.

Our research model and the hypotheses stated above are visualized in Fig. 1, below.

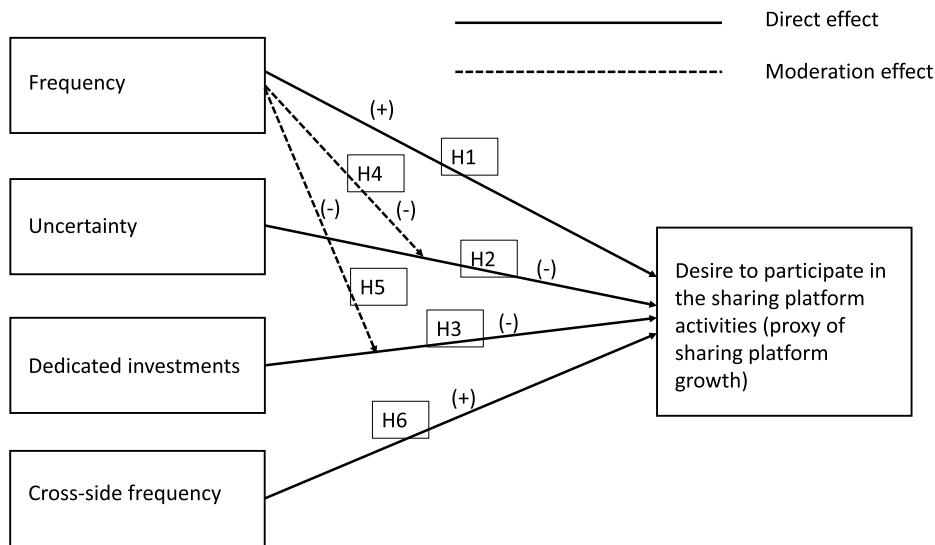


Fig. 1. Research model.

4. Methodology

To test our hypotheses, we carried out a survey among *Miutcánk* community members, a Hungarian P2P sharing platform. The sharing platform was established in 2014, and at the time of the survey, in Spring 2019), it had almost fifty thousand registered members. However, five years after its launch, *Miutcánk* hadn't yet begun the typical exponential growth pattern, which is a hallmark of successful sharing platforms. Further, the platform was still P2P in nature, with the owners having not yet intervened explicitly and strategically in the platform governance through the adoption of integration mechanisms. As such, *Miutcánk* represented an ideal setting for research aimed at identifying factors that present obstacles to sharing platform growth. We now describe *Miutcánk* and its primary activities, as well as present in detail the survey methodology used in our paper.

4.1. *Miutcánk* and its sharing activities

Miutcánk promotes several activities among its registered members.

- *Provision of advice/information (PI)*: members read requests for info and advice made by other members of the platform and, whenever they have the competence and the time, provide the requested information and advice. This exchange takes place through the platform's messaging tools and without the need for a physical meeting.
- *Search for advice/information (SI)*: when members have need something or have a problem to fix, they seek advice/information from other members of the platform. The info/advice is generally provided through platform messaging tools. Examples of advice/information provision and search include DIY/home improvement tips and places to go to eat, etc.
- *Lending of objects/tools/devices (LO)*: members make their objects, tools, and devices available for sharing with other members of the platform. Physical proximity is a facilitating factor.
- *Borrowing of objects/tools/devices (BO)*: instead of buying the objects/tools/devices, platform members borrow them from other members of the platform. Tools include household items and repair equipment.
- *Freelancing work services (FW)*: members offer their personal/professional services to other members of the platform. They may work from home (remotely) or at the employer's premises or elsewhere, depending on the nature of the work.
- *Hiring of freelance workers (HW)*: when members need help for themselves, family, or business, they search for available skills and workers on the platform. Depending on the nature of work assigned, freelancers work from home (remotely), at their premises, or elsewhere, Examples of freelance services include electricians, plumbers, etc.

The above activities define three distinct markets: 1. information sharing, 2. sharing of objects, and 3. freelance work sharing, with the single activities listed above representing the two sides of each market.

4.2. Survey sample

Due to the limited size of the platform (comprising, as of May 2019, a total of 46,579 active and non-active users registered), our survey targeted the entire population of members of *Miutcánk* (i.e., the sampling frame comprised all platform members and the survey design was based on full sampling of the population). Because of the partial availability of valid email accounts, we sent our

questionnaire to a frame population of 36,866 registered members. The questionnaire was administered via Computer-Assisted Self-Interviewing (CASI). Members were contacted via email by the *Miutcánk* platform itself and invited to self-compile a web-based, closed-question, structured questionnaire. The questionnaire was developed in English and then professionally translated into Hungarian before being delivered to the platform members, all of whom were residents of Hungary. Data was collected from April to May 2019. We obtained 772 survey responses with a gross response rate of 2.1 percent. Several studies have shown that a low response rate in web surveys does not necessarily increase non-response error (Keeter et al., 2000; Kaplowitz et al., 2004; Groves, 2006). After cleaning the dataset, 650 full responses were used for data analysis, with a net response rate of 1.8 percent.

The sample of sharing platform members' profiles is described in Table 2. Most surveyed individuals have an academic degree (66 percent), are employed (72 percent), live alone or with their partner (58.8 percent of the cases), and are mostly in urbanized or semi-urbanized areas (95.2 percent). Based on the available literature (Hamari et al., 2016), this sample profile reflects sharing platforms more generally.

Before proceeding with hypothesis testing, we controlled for the possible response bias caused by the different characteristics of the respondents versus the non-respondents. Indeed, we found some differences between the sample and the survey population, as reported in Table 3.

The sample is different from the survey population in terms of age (46 vs. 38, respectively) and gender (male: 44.5 percent vs. 49.2 percent, respectively), that is, respondents are slightly older and have a higher proportion of females than the population they come from. There may be two reasons for this. First, the sample is representative of active platform members and not of the overall registered members. Second, there may be a different propensity among active members to take part in surveys, resulting in a higher percentage of women and older members. A much more evident difference between the sample and the survey population pertains to the year of registration to the platform. It is evident that the sample under-represents the strata of the population that registered in the early years of platform operation (2014 and 2015), leading to an over-representation of the most recent registrations (from 2016 to 2019). Rather than reflecting the poor quality of the available mail addresses of the first registered members, we believe that such different 'weights' in the strata of the sample may mostly reflect the different levels of activity and engagement of the older members of the platform, that is, most of the first registered members are no longer active. Furthermore, as this platform is at an early stage of development, the low representation in the sample of members who registered earlier may also reflect their lack of interest in the future use of the platform, which may result in a lower survey response rate. Overall, despite the different strata 'weights', we consider the sample to be representative of active members of *Miutcánk* albeit less so of all registered platform members. Since the purpose of our research is not to specifically draw inferences about the actual profile of the *Miutcánk* platform users per se but to identify associations and correlations among variables and possible causation effects between independent variables and the levels of participation on the platform, we do not consider the sampling and response biases to be of concern. However, to rule out any possible bias in our results, we carried out four

Table 2
Sample key demographics and profile.

	Percentage of total sample
Education	
- No high school	2.9
- High school	16.7
- Some college	14.2
- Bachelor	30.1
- Master/MBA	32.5
- PhD	3.6
	100,0
Occupation	
- Fully employed	59.6
- Part-time	10.7
- Student	1.7
- Not employed	28.0
	100,0
Area of residence	
- Urban	81.1
- Semi-urban	14.1
- Rural	4.8
	100,0
Family size	
- 1	21.3
- 2	37.5
- 3+	41.2
	100,0
Multihoming	
- Only membership of <i>Miutcánk</i> platform	84.8
- Membership of other similar sharing platforms (multihoming)	15.2
	100,0
Satisfaction level with the platform (range 1–5)	4.10

Table 3
Sample v. Survey Population Characteristics.

	Sample (N = 650)	Survey population (N = 36,866)
Average age	45.8 years	38.0 years
Gender		
- Male	44.5%	49.2%
- Female	55.5%	50.8%
	100,0%	100,0%
Year of registration:		
- 2014	19.4%	54.5%
- 2015	12.9%	18.7%
- 2016	18.3%	5.9%
- 2017	17.4%	4.1%
- 2018	21.4%	9.1%
- 2019	10.6%	7.7%
	100,0%	100,0%

robustness checks. The nature and results of these checks are presented further in the Results section.

4.3. Dependent variable

For the purposes of our analysis, we used a proxy for platform growth as the dependent variable for this study: current members' desired levels of future participation in platform activities. This measure is a subjective evaluation of the desire of a sharing platform's members to participate in the platform in the future. For each activity on *Miutcánk*, survey respondents were asked the following question: "With what intensity do you desire to participate to *Miutcánk* in the future?". This was asked for each of the platform activities described above. For each activity, platform members were asked to rate their desired participation on the platform using a 5-point Likert scale, with the rating ranging from 0 (indicating no desired participation) to 5 (indicating heavy participation).

Considering that the research data were collected through a self-compiled questionnaire, with all participants receiving the questionnaire from the sharing platform owner, we needed to address common method bias. One potential issue is the overstatement or inconsistent assessment of members' activity levels on the sharing platform, which affects measures of transaction frequency and our dependent variable. While it wasn't possible to combine subjective and objective measures (those which could be obtained, for instance, from the log-files of the platform members), we could rule out the statistical consequences of common method bias by collecting and comparing the current transaction frequency with two alternative measures of our subjectively assessed dependent variable: expected and desired levels of participation. Expected participation in the sharing platform takes into consideration the many practical obstacles, constraints, barriers, and related challenges of a member's future contribution to the sharing platform. Survey respondents were asked to consider their expected level of participation over the next 12 months. Expected and desired participation differ when a sharing platform member would like to contribute more to the sharing platform (high desired participation) but knows they will not be able to do so soon (low expected participation) because of some impeding factors. The data collected (Table 4) show that the average desired levels of participation are consistently higher than expected, which in turn are higher than the current levels, demonstrating that the collected data have internal consistency.

We conducted *t*-tests for all the above mean values and found significant differences within each activity and for each pair of participation statuses (current vs. desired vs. expected), with significance levels of 0.000 (2-tailed). In sum, the data show that levels of participation differ by platform activity and that levels of current participation in platform activities are always lower than desired levels. Overall, there seems to be a typical pattern of platform evolution taking place, with platform members progressively engaging, albeit slowly, in higher levels of participation. This evolution impacts all platform activities, which display a positive and significant degree of correlation (Table 5).

4.4. Independent variables

Independent variables are represented by the TCE transaction features constructs discussed at length in Section 3. Frequency was

Table 4
Mean levels of current, desired and expected participation.

Platform activity	Current participation (max N = 650)	Expected participation (max N = 461)	Desired participation (max N = 552)
Provide information	0.92	1.92	2.33
Supply information	0.87	1.80	2.21
Lend objects	0.53	1.54	1.98
Borrow objects	0.44	1.43	1.83
Freelance work	0.26	0.93	1.25
Hire freelance workers	0.17	0.84	1.10

(0 = no participation; 1 = light participation; 5 = heavy participation).

Table 5
Correlation coefficients between current levels of participation in platform activities.

	Provide information	Search information	Lend objects	Borrow objects	Freelance workers	Hire freelance workers
Provide information	1					
Search information	.644***	1				
Lend objects	.516***	.476***	1			
Borrow objects	.495***	.584***	.651***	1		
Freelance workers	.344***	.356***	.348***	.335***	1	
Hire freelance workers	.357***	.372***	.338***	.397***	.591***	1

Correlation is significant at the 0.05 level (2-tailed). * Correlation is significant at 0.01 (2-tailed).

measured by the current level of participation on the sharing platform. Members were asked the following question: “*To date, with what intensity have you participated on Miutcánk?*?”. Sharing platform members were asked to rate the intensity of frequency based on their past and current participation on the platform (0 = no current participation; 1 = light participation; 5 = heavy participation). Uncertainty was measured by a four-item scale aimed at capturing both the environmental and behavioral dimensions of transaction uncertainty and validated using principal component analysis (see Table 4). The questions were adapted to specific activities performed on the sharing platform and to specific roles played by members. For instance, regarding lending of tools on the sharing platform, members were asked to rate the following four statements using a 5-point Likert scale (1 = I fully agree; 5 = I fully disagree).

- *I am confident I can find users on this platform to whom I can lend my tools.*
- *It is easy for me to lend tools to this platform.*
- *With respect to the lending of tools, I trust the information provided on the platform.*
- *I am confident that the lending of my tools will not cause any trouble (e.g., no damage to the tools shared, no cancellation of the agreement without appropriate warning, no problems with payments, etc.).*

For dedicated investments, the questionnaire targeted only the supply side of the sharing platform. A three-item scale was used, using a 5-point Likert scale (1 = I fully agree; 5 = I fully disagree). In the case of lending tools, the items were as follows.

- *To lend the desired quantity of my tools on Miutcánk I should make further investments/purchases.*
- *To lend the desired quantity of my tools on Miutcánk I should invest more money than before.*
- *To lend the desired quantity of my tools on Miutcánk I should invest more time than before.*

4.5. Independent variable scale validation

To validate the multi-item scales of uncertainty and dedicated investments, principal component analysis was applied to examine if items were grouped to the corresponding variables and if the number of factors was the same as expected. The extraction of components was based on eigenvalues greater than 1. In total, the expected two components were obtained from seven items, with a total of 75.3 percent of the variance explained. The items of each component are in line with the corresponding variables (i.e., transaction uncertainty and dedicated investments). To reduce collinearity between the variables, we rotated the components through a Varimax method with Kaiser Normalization to obtain a rotated orthogonal factor score for each item. All factor loadings for the items were greater than 0.7. Further, Cronbach’s Alpha scores for each variable were all greater than 0.85. Following Hair et al. (2016), we also calculated the composite reliability value (CR) and the average variance extracted (AVE). Generally, factor loadings above 0.5, Cronbach’s Alpha exceeding 0.7, AVE above 0.5, and CR values above 0.7 are considered satisfactory (Fornell and Larcker, 1981). Table 6 shows the correlation matrix for the construct validity test for one of the platform activities (lending objects), where all the above conditions are met. We repeated similar tests for all other platform activities, validating all our constructs for uncertainty and dedicated investments.

4.6. Control variables

Nine control variables have been included and measured for every survey participant: age, gender, education, employment (we have clustered participants in two groups: employed full-time vs. not employed full-time, comprising part-time workers, students, and

Table 6
Correlation matrix for the construct validity tests – Lending objects.

Construct	Variable	Cronbach Alpha	AVE	CR	1	2	Mean	Std. Dev.
1	Uncertainty	0.873	0.725	0.913	1		2.656	0.947
2	Dedicated investments	0.856	0.774	0.911	-0.108**	1	2.381	1.065

Note: CR=Composite reliability. AVE = Average variance extracted. The extraction method used for the factor loadings was Principal Component Analysis, Varimax rotation with Kaiser normalization, and KMO measure of sampling adequacy: 0.769. Bartlett’s test of sphericity, Chi-square 1364.675, df21, p < 0.000. Total variance explained 75.29%.

**Correlation is significant at the 0.05 level (2-tailed).

Table 7
Correlation matrix between dependent, independent, and control variables.

		Mean	St. dev	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Desired level of participation in Lending Objects (LO)	1.98	1.42	1												
2	Age	45.81	13.76	-.275***	1											
3	Gender (1 = male)	0.44	0.50	-.146***	.030	1										
4	Education (years)	15.82	2.11	.063	.035	-.044	1									
5	Employment (Full-time = 1)	0.72	0.45	.126***	-.582***	.014	.044	1								
6	Urban category	1.22	0.51	-.032	-.008	.066	-.027	-.032	1							
7	Family category	2.00	0.66	.000	-.118***	.017	.004	.124***	.093**	1						
8	Years since registration	3.60	1.65	-.086**	.133***	.093*	.053	-.095**	-.060	.064	1					
9	Multihoming	0.16	0.37	.014	.001	.032	.116***	-.025	-.001	.028	.135***	1				
10	Satisfaction level	4.10	0.98	.239***	.012	-.123***	-.028	-.030	-.033	-.096**	-.103***	-.063	1			
11	Uncertainty	2.66	0.95	-.495***	.084	.052	.096	-.041	.061	.043	.099	.066	-.377***	1		
12	Dedicated investments	2.38	1.06	-.081	-.073	.016	-.233***	.011	.078	.013	-.040	-.023	-.025	-.108**	1	
13	Current level of participation in Lending Objects (LO)	0.529	1.06	.398***	-.052	.035	.056	-.009	-.080*	-.010	.064	.094*	.165***	-.282***	-.018	1
14	Current level of participation in Borrowing Objects (BO)	0.438	0.99	.387***	-.181***	.041	.048	.083*	.095*	.013	.063	.073	.167***	-.211***	.053	.651***

** Significant at the 0.05 level (2-tailed).

*** Significant at the 0.01 level (2-tailed).

unemployed people); area of residence (we have used urban, semi-urban, and rural categories); family size (e.g., singles, couples, and larger families); number of years of membership of *Miutcánk*; multihoming, that is, membership of other sharing platforms (this is a dummy variable, with “1” denoting the membership of other similar sharing platforms); and satisfaction levels with the sharing platform (this measure reflects the answer to the following question: “How likely would you recommend this platform to other possible users?”, with possible answers ranging from 1 - very unlikely - to 5 – very likely). Control variables were included in the regression model to rule out other explanations for the desired levels of future participation in sharing platform activities. Indeed, participation levels (and platform growth) may be affected not only by the sharing platform transaction features, but also by reasons unrelated to transaction costs. For instance, we could expect that a full-time employed person may show different desired levels of participation in the sharing platform compared to an unemployed member. We can also expect that a user more satisfied with the sharing platform may be more inclined than another, less satisfied, to participate in sharing platform activities in the future, irrespective of transaction features. Family size may also represent a possible explanatory variable of participation in the sharing platform, with bigger families being associated with higher volumes of transactions on the sharing platform. The correlation matrix for the dependent, independent, and control variables is reported in Table 7.

As the correlation coefficients do not show multicollinearity, none of the variables were excluded from (or transformed in) the regression.

5. Results

In Table 8, we see the platform members split into two clusters. The first cluster (491 members, 75.6 percent of respondents) includes users who generally showed a low level of participation in platform activities, while the second cluster (159 members, 24.4 percent of respondents) includes the participants who were the most “active”. For the purposes of this research, it is noteworthy that the differences in age, gender, education, employment status, and years since registration are not statistically significant between the two groups.

Table 9 reports the levels of TCE variables (frequency, uncertainty, and dedicated investments) for the different sharing activities, and within the two clusters, with the sharing of information consistently reporting higher frequency levels, followed by the sharing of objects and freelance work. This is in line with our expectations, as the sharing of information requires less effort from the platform member than the sharing of objects and freelance work, respectively. In the same table, significant differences are reported in the uncertainty levels relative to the sharing activities, with the most active members perceiving lower uncertainty compared to the least active members. Instead, differences in the dedicated investment levels, while noticeable, are not statistically significant between the two clusters.

To test our hypotheses, we have focused only on one sharing platform activity, that is, on the sharing of objects, as it seems the more appropriate activity for a comprehensive measurement of all TCE transaction features. In particular, the sharing of objects is more closely associated with dedicated investments compared to the supply/demand of freelance work services. Further, it is relevant for the purposes of our research that this type of sharing requires a physical meeting between platform members (i.e., the object lenders and the object borrowers) or a physical delivery of the object. As such, the generation of network effects requires a certain geographic proximity, and this condition may impede the full realization of such effects beyond the local level (Gawer, 2021), thus limiting the growth potential of a platform.

To test our hypotheses on the determinants of transaction costs and sharing platform growth (using our proxy), we ran an ordinary least squares (OLS) regression in three hierarchical steps (models). In the first step, we included only our nine control variables (age, gender, education, employment, family size, urban residence, years since registration, membership of other platforms, satisfaction level); in the second step, we added the TCE-related variables (i.e., uncertainty, dedicated investments, and frequency) to measure their direct effects. The third and final steps included interaction terms and the cross-side frequency effect. The results of our regression are reported in Table 10.

Our regression model supports all three hypotheses on the direct impact of transaction features on sharing platform growth (H1, H2, and H3). As for the moderating effects, H4 (on the frequency/uncertainty interaction) is supported by our data. By contrast, the regression model shows a statistically insignificant and negligible moderating effect of transaction frequency on the dedicated investments/sharing platform growth relationship (not supporting H5). The final hypothesis H6, on the positive cross-side frequency effects on desired levels of participation, is supported by our data, although at a lower level of statistical significance. As far as the control variables are concerned, age and gender have a significant effect on the dependent variable (i.e., male, as well as more senior, members show a lower desire to participate), while satisfaction level is highly significant in the regression, although only in the first step

Table 8
Sample characteristics and clustering.

		% males	Age	Years of education	Employed %	Registration Years	% multi homing
Total sample (N = 650)	Mean	44	45.8	15.9	72	3.60	0.16
	St. dev.	0.50	13.8	2.10	0.45	1.65	0.37
Cluster 1 Less active Members (N = 491)	Mean	45	46.2	15.8	73	3.55	14.9
	St. dev.	0.50	13.6	2.13	0.44	1.65	0.35
Cluster 2 More active Members (N = 159)	Mean	42	44.5	16.0	70	3.73	20.8
	St. dev.	0.49	14.14	2.03	0.46	1.63	0.41
ANOVA sig.		0.390	0.155	0.232	0.419	0.245	0.081*

*Significant at the 0.10 level(2-tailed) ** Significant at the 0.05 level (2-tailed). *** Significant at the 0.01 level (2-tailed).

Table 9

A comparison of mean values for frequency, uncertainty, and dedicated investments for the two clusters.

	<i>PI</i> Frequency	<i>PI</i> Uncertainty	<i>PI</i> Dedicatedinvestments	<i>SI</i> Frequency	<i>SI</i> Uncertainty	<i>LO</i> Frequency	<i>LO</i> Uncertainty	<i>LO</i> Dedicatedinvestments	<i>BO</i> Frequency	<i>BO</i> Uncertainty	<i>FW</i> Frequency	<i>FW</i> Uncertainty	<i>FW</i> Dedicatedinvestments	<i>HW</i> Frequency	<i>HW</i> Uncertainty
Total sample (N = 650)	0.92	2.17	2.66	0.87	2.40	0.53	2.66	2.38	0.44	2.71	0.26	2.83	2.50	0.17	2.99
Cluster 1 Less active members (N = 491)	0.43	2.28	2.70	0.39	2.50	0.15	2.79	2.43	0.10	2.89	0.05	2.88	2.54	0.04	3.06
Cluster 2 More active members (N = 159)	2.44	1.89	2.57	1.71	2.16	1.71	2.33	2.27	1.49	2.52	0.90	2.71	2.39	0.55	2.79
ANOVA sig.	.000***	.000***	0.224	.000***	.000***	.000***	.000***	.194	.000***	.009***	.000***	.097*	.201	.000***	.006***

(0 = lower level; 5 = higher level).

*Significant at the 0.10 level (2-tailed) ** Significant at the 0.05 level (2-tailed) *** Significant at the 0.01 level (2-tailed).

Table 10

Regression analysis on desired levels of participation in the platform activities (for Lending Objects - LO).

Dependent Variable	Model 1		Model 2		Model 3	
	St. coeff.	t	St. coeff.	t	St. coeff.	t
Desired level of participation in LO						
(Constant)		2.2118		3.611		3.645
Age	-.290***	-4.803	-.257***	-5.050	-.233***	-4.509
Gender	-.065	-1.305	-.086*	-2.049	-.102***	-2.418
Education	.041	.828	.043	1.022	.040	.948
Employment	-.072	1.197	-.080	-1.575	-.071	-1.419
Urban residence	-.022	-.441	.037	.902	.045	1.077
Family size	.022	.438	.015	.371	.007	.157
Years since registration to the platform	-.043	-.872	-.036	-.861	-.041	-.986
Multihoming	.041	.836	.021	.511	.022	.530
Satisfaction level	.271***	5.504	.057	1.257	.050	1.108
Uncertainty			-.385***	-8.451	-.441***	-8.890
Dedicated investments			-.084**	-1.997	-.096**	-2.045
Current level of participation in LO (Frequency)			.281***	6.451	.259***	4.283
Current participation (Frequency)*Uncertainty					.135***	2.715
Current participation (Frequency)*Dedicated investments					.003	.056
Current level of participation (Frequency) in BO					.095*	1.677
R ²	.134		.389		.404	
Δ R ²	.134		.255		.015	
Model F	7.426		20.809		17.918	
N	375		375		375	

* Significant at the 0.10 level (2-tailed). ** Significant at the 0.05 level (2-tailed). *** Significant at the 0.01 level (2-tailed).

(the one including only the control variables), with the significance of satisfaction level reducing when the current level of participation (transaction frequency) is introduced in the regression.

As a last part of our data analysis, to rule out any possible bias in our results caused by the high non-response rates, and increase structural validity, we carried out a series of robustness checks. First, we have included the year of registration in our regression model to check for any effect of this regressor on the level of the dependent variable. Second, we ran our regressions on two alternative samples: one including the 2014 registered members (2014, the platform's establishment year shows the higher sampling bias in the sample) and one excluding 2014 registered members. The results of our regression models are not affected by the exclusion/inclusion of these strata, nor are the significance levels of the regression coefficients. Third, we have included weights (population strata/sample strata) as an auxiliary variable in the regressors to check whether this variable displays statistically significant associations with the dependent variable. The standardized coefficient for the weights is not statistically significant, thus rejecting this possibility. For a final check, we recalculated the weighted means and standard deviations for the dependent variable and compared them with the unweighted means and standard deviations. The t-tests are not statistically significant, rejecting the hypothesis that the means are different.

Finally, as a further check, we have run an endogeneity test based on a reduced form of our regression model, using our control variables as instrumental variables, and adopting a 2SLS (two-stages least squares) procedure, inclusive of a Hausman's specification test.

6. Discussion

This research uncovers five important factors that generate transaction costs that inhibit sharing platform growth.

1. Current transaction frequency (participation levels in platform activities) exerts a direct positive effect on future desired levels of participation in sharing platform activities.
2. Transaction uncertainty discourages future participation in the sharing platform.
3. Lower levels of desired future participation on the sharing platform are strongly associated with the need for more dedicated investments in shared assets.
4. The degrees to which sharing platform members participate on the sharing platform (current transaction frequency) counterbalances the negative relationship between transaction uncertainty and sharing platform growth.
5. Participation levels on one side of the sharing platform significantly increase future levels of activity on the other side of the platform. Such cross-side effects magnify transaction frequency and its outcomes, reducing sharing platform-level transaction costs.

Overall, our study has uncovered important forces that account for the current growth patterns and dynamics of *Miutcánk* and may help predict its future growth. While we could not provide conclusive evidence of the moderating role played by transaction frequency on the association between dedicated investments and platform growth, our results confirm that transaction features, such as uncertainty and dedicated investments, impose higher levels of transaction costs and constraints on the growth of sharing platforms. In such situations, unless appropriate measures are adopted, platform growth may be impeded (Kuan and Lee, 2019). In sum, our study demonstrates that TCE provides a convincing explanation for how sharing platform transactions become inefficient in the presence of

high transaction costs caused by high levels of uncertainty in combination with the need to make transaction-related or platform-dedicated investments.

The above findings have relevant implications for platform owners. Akbar and Tracogna (2018) have developed a set of conceptual propositions regarding the likely impact of transaction costs on sharing platform governance and, namely, on the required degree of a sharing platform's integration. In line with their arguments, we posit that P2P sharing platforms, when facing increasing transaction costs along their growth path, need to evolve toward *integrated* sharing platforms. P2P platforms seem to be quite effective governance modes for transactions that take place occasionally, with low-to-intermediate levels of uncertainty, and with generic investment characteristics (Carter and Hodgson, 2006). However, as sharing platforms grow, transactions extend among relatively unknown members, and both environmental and behavioral uncertainty increase, thus discouraging dedicated investments. As a result of these dynamics, transaction costs increase, and so does the importance of establishing the conditions for an effective governance of the sharing platform.

The above conclusion is fully consistent with the TCE perspective, which highlights both the issue of transaction costs and its solution, that is, economizing on transaction costs via the adoption of more integrated governance modes (Williamson, 1996). Following this line, we have identified a set of specific mechanisms that can address governance issues. First, *measurement* mechanisms are used to control uncertainty. Platform owners may decide to limit platform access only to a specific set of goods or services that meet a predefined standard of quality through preselection or prescreening activities. The platform can also promote the collection and sharing of information among users to encourage platform participation (such as rating the services provided) and encourage the exchange of feedback on the members' ratings (on the other side of the platform) to build a reputation and attract additional members onto the platform. Platform owners may enhance trust by developing systematic and reliable review functions on the platform, which enable users to rate their experience as well as provide information on other platform users as a signaling mechanism on trust and reputation. A second group of integration mechanisms—*adaptation*—are also associated with the control of uncertainty. These mechanisms typically relate to the administrative roles carried out by the platform owner, who acts as a third-party intermediary between platform users. In their capacity as “regulators” of the marketplace, sharing platform owners can establish and administer contracts between users, manage payments, define the terms of service, and manage rules and standards (regarding safety, health, and quality). Additionally, platform owners may develop active arbitration mechanisms to facilitate dispute resolution in platform transactions. Third, a group of *safeguarding* mechanisms that protect dedicated investments can be integrated into the platform. As sharing platforms grow, owners are increasingly inclined to provide insurance and warranties to protect the investments made by members or the products accessed through their platform. Product and service guarantees may be one type of safeguarding mechanism. Another type of safeguarding mechanism refers to the internalization of transactions in response to the preference expressed by users/providers to directly transact with the platform owner itself. At the extreme, platform owners select their own inventory of assets and make them available for sharing, including the provision of complementary products or services. Table 11 summarizes the key available mechanisms of platform integration.

In sum, from a TCE perspective, the platform owner holds the strategic responsibility of adopting governance modes and mechanisms that address transaction costs. Proper governance and effective strategic management of a sharing platform fosters a virtuous circle of growth: increased participation in the platform spreads fixed costs over more transactions (higher frequency), justifying further dedicated investments by platform members and by the platform owner itself. This increased transaction frequency, complemented with both appropriate mechanisms of measurement and trust building, as well as safeguards on dedicated investments (such as insurance coverage), may create the conditions for further sharing platform growth.

The above findings not only shed light on transaction costs in digital platform dynamics but also complement the literature on platform economics and on the strategic management of platforms (Gawer, 2021) by further extending the role of the platform owner. According to the extant literature, the platform owner acts as the supply and demand mediator in a two-sided market (Parker and Van Alstyne, 2005; Armstrong, 2006; Rochet and Tirole, 2006; Baldwin and Woodard, 2009), with both sides of the market electing to interact through a platform rather than doing so directly (Hagiu, 2006; Eisenmann et al., 2006). Further, the platform owner acts as a market maker (Farrell and Katz, 2000) and as the regulator of access to (and of the interactions among) the different sides of the platform

Table 11
Platform integration mechanisms (Source: authors' own).

Measurement mechanisms
Pre-selection of goods/services to be exchanged on the platform
Collection and exchange of information on products and platform members
Development of trust and reputation-building of platform members
Adaptation mechanisms (third-party administrative support)
Rule-setting, definition of the terms of service, safety, and quality
Administration of transactions and contracts
Price definition and management of payments
Safeguarding mechanisms
Asset protection and provision of warranties and insurance coverage
Supply of complementary products
Direct supply/demand of products

(Boudreau and Hagiu, 2009). It also supplies trust in the platform ecosystem whilst assuring platform sustainability by increasing switching costs and locking in platform users (Shapiro and Varian, 1998). Platform owners may also support the supply side of the platform with complementary products or services (Hagiu and Wright, 2015; Hagiu and Altman, 2017; Cennamo, 2018). Furthermore, owners take care of measurement issues and management control mechanisms of sharing platforms (Goldbach et al., 2018), provide safeguarding mechanisms (Förderer et al., 2018; Tiwana, 2014), make architecture decisions, and generate “identity effects” for the development of a platform’s competitive advantage (Cennamo, 2019). However, despite the rich insights provided by the above literature, it is only by adopting a TCE perspective that we can provide a thorough and unitary presentation of the mechanisms available to the platform owner for the strategic management and governance of platforms, including the identification of the specific conditions when the platform owner should take the initiative to evolve platform governance from a P2P to an integrated one.

7. Conclusions, limitations, and future research

Our paper has analyzed the conditions for a sharing platform’s establishment and growth. Through an empirical application of TCE and of its three main variables—frequency, uncertainty, and dedicated investments—we analyzed said variables’ expected direct and indirect consequences with regard to the levels of desired participation in platform activities (our proxy for platform growth). Based on our empirical analysis, alongside the literature on network effects and trust-building in sharing practices, TCE provides a compelling and complementary explanation for how sharing platform-based economic transactions may become inefficient in the presence of high transaction costs caused by high levels of uncertainty when combined with the need to make transaction- or sharing platform-dedicated investments. Such an explanation goes as follows: most sharing platforms at their launch are P2P; in the early stages, operating such platforms may be efficient (i.e., less expensive, less investment-demanding) and gratifying (as it promotes horizontal relations, spontaneous exchanges, absence of hierarchy) for both the members and the owner. However, as the platform grows and includes increasing marginal transactions, it may soon become risky and unattractive for its members, as the implied significant increases in transaction costs easily counterbalance the network effects, with negative impacts on platform growth. In such instances, members may decide to abandon the sharing platform or reduce their levels of participation. The need to face transaction uncertainty and to commit to sizeable, dedicated investments may ultimately discourage members from further participating in platform activities (owing also to a lack of trust).

In sum, while their collaborative nature may represent the main strength of early-stage P2P platforms, the increasing number of transactions, and the addition of new marginal users to the platform community cause a progressive misalignment between the nature of sharing platform transactions and governance modes (which tend to remain P2P). This is when, as we posit in this research, P2P platforms evolve toward greater platform integration. Integration mechanisms range from the pre-selection of goods and services to be accessed, to the promotion of information sharing among users, the exchange of feedback on users’ ratings, the administration of exchange contracts, and systematic tactics such as ownership of assets shared on the platform, displacing P2P transactions with centralized ones. These actions, *in toto*, which we have reported in Table 11, represent forms of platform integration, allowing P2P sharing platforms to evolve toward a more structured organizational entity.

A brief consideration of more established sharing platforms than the ones we examined in our paper supports the above implications. It is evident that by developing a rigorous due diligence process for platform users, established sharing platforms such as Airbnb, Lyft, and TaskRabbit have managed to overcome transaction uncertainty and reinforce platform reputation. Moreover, through targeted acquisitions and by offering multiple sharing products or services, more mature sharing platforms have been able to increase transaction volume by bringing in multiple users across different segments. For example, the introduction of Airbnb Plus and Lyft Lux attracted more users seeking enhanced services and experiences, thereby achieving platform growth. Through the introduction of insurance coverage for shared assets, both Airbnb and Lyft reduced transaction uncertainty. Lyft offering six-seater vehicles, Airbnb making luxury holiday villas available for rent, and TaskRabbit recruiting highly specialized freelancers all enable platform owners to respond to the demand for variety among users and enhance growth opportunities for the platform. All these aspects brought together create a virtuous circle of growth for platform owners. First, more users are attracted to the platform through the provision of more services/assets. Increased participation in the platform spreads fixed costs of platform operation across more transactions (transaction volume increase), and this in turn generates valuable data to better understand user demands and practices. Second, increased uncertainty that may be generated by the addition to the platform of transactions among new and relatively unknown users is managed by further investments by the platform owner, aimed at increasing trust and reputation and thus enabling effective control of uncertainty. Third, the progressive collection of user data enables sharing platforms to better segment clients and effectively target users through differentiated products and services (thus increasing the chances of achieving positive returns on dedicated investments).

However, this virtuous cycle is not self-sustaining, as platform integration may be too costly for early-stage P2P sharing platforms, whose founders/owners lack sufficient strategic and entrepreneurial vision to grow organically, either by adopting transaction governance models that significantly economize on the transaction costs or via the acquisition of other sharing platforms. This may also reflect a lack of economic incentives, as most sharing platforms are not established as business models, and their organizational modes remain rather rudimentary. In such situations, the persistent misalignment between the nature of the transactions and the way the platform is governed and strategically managed by its owner may eventually cause a sharing platform’s failure to grow. Ultimately, the lack of growth of a sharing platform can be attributed to fundamental problems with the transition from peer-to-peer (P2P) to integrated governance.

While this conclusion derives from research that was specifically focused on sharing platforms (as they seem to be particularly affected and defined by their P2P, early-stage, nature), it may be easily extended to all types of digital platforms. In conclusion, we concur with those who argue that, despite all the changes brought by the digital transformation of economic transactions, TCE still

provides a useful lens to aid our understanding of the governance and strategic management of economic activity (McIntyre and Srinivasan, 2017; Nagle et al., 2020).

Our paper presents the following limitations. First, our study is not comparative; further comparative research could inform our understanding of platforms at different stages of development. Second, we examined an early-stage P2P sharing platform: longitudinal studies of a platform to document and evaluate growth patterns would also be useful to understand what happens when platforms grow. Third, while our paper is the only study to date that empirically estimates the role of transaction costs in influencing the behaviors of sharing platform users (and strategic decisions of platform owners), our measures of behavior and transaction costs could be further refined. For example, our use of individual participation levels as a proxy for sharing platform growth is a possible limitation because the overall volume of transactions taking place on a sharing platform also relies on the number of new members. Moreover, churn rates can also have relevant impacts on the growth rates of sharing platforms. Measures of uncertainty and dedicated investments have been defined and adapted to the Hungarian platform under study: if our aim is to study the different types of sharing platforms, more inclusive and general measures of transaction features could be employed in future sharing platform research. Fourth, since our focus has been on TCE, there is an opportunity for future research to consider other variables that impact sharing platforms. For example, further research could explore how scaling advantages in the form of monopolistic rents may influence sharing platform growth. Lastly, our paper has not explicitly considered the role of macro-level factors (i.e., technological and social evolution) on the growth of sharing platforms.

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Availability of data and material

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