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Exploring antecedents of behavioural intention and preferences in online peer-to-peer resource sharing in a Swedish university setting

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Abstract

Resource-optimization platforms appear as a valid option to more sustainable modes of consumption. The success of these platforms mostly depends on the capability to comprehend the potential users' motives for engagement. We developed and tested a conceptual model based on the Theory of Planned Behaviour (TPB) to investigate the relative significance of consumer motives for and against using a peer-to-peer (P2P) sharing platform. Qualitative interviews of an elicitation study (n=7) followed a quantitative survey (n=325) with potential users. The size of the demand for accessing specific products and services and the type of transaction mode preferred were also investigated. Attitude towards using a P2P sharing platform is the strongest predictor of behavioural intention among the TPB constructs. Ecological sustainability, sense of belonging, trust in other users, and familiarity are the most critical factors determining the attitude towards using the potential platform; process risk concerns were identified as the main hinder. There were more providers than takers to all likely items inquired, and accommodation and car-sharing had the most significant asymmetric ratios remarkably. Services in general and study materials were the items with the highest potential demand and supply. The preferred mode of exchange for the platform is a free system which includes donation and second-hand sales, and transfer of points or money. This study contributes to a better understanding of consumer motivations and desires to engage in sharing resources for sustainability transformations.

Keywords: sharing economy; peer-to-peer sharing; behavioural intention; sustainable consumption; theory of planned behaviour; sustainability.

1. Introduction

Idle resources and the popularization of Information and Communication Technologies (ICTs) tools among consumers have contributed to the re-emergence of collaborative ways of consumption, often referred to as sharing economy or collaborative consumption (Ryu et al., 2018). In this "novel" socio-economic paradigm, ICT redefined traditional sharing, bartering, lending, trading, renting, gifting, and swapping (Botsman and Rogers, 2011). Consumers grant each other temporary access to underutilized physical assets ("idle capacity"), possibly for money, through an online platform (Frenken and Schor, 2017). Online market places emerged as a more resource-efficient way to fulfilling a range of customer needs, including mobility, accommodation, meals, and even investments and personal loans. The interest in the sharing economy has increased not only by users but also by investors who are optimistic about their profit potential. For example, by early 2019, Uber had a higher valuation (US\$72bn) than the market capitalization of General Motors (US\$56bn); Airbnb (US\$31bn) was valued almost as much as the world's largest hotel chain Marriot (US\$44bn) (Wirtz et al., 2019).

Despite its financial promises and environmental expectations, a few fundamental aspects remain unclear. First, the sharing economy has disrupted some solid market segments such as tourism and accommodation (e.g., Airbnb) and urban mobility (e.g., Uber). However, whether we are only experimenting with the surge of market niches or a large-scale transition towards sustainable consumption modes in several areas is an ongoing debate. Second, scholars have started exploring reasons of users to take part in the sharing economy (e.g. Bucher et al., 2016; Hamari et al., 2016; Hawlitschek et al., 2018) but they have departed from a selected set of factors.

In this study, we explored antecedents of behavioural intention and preferences to use an online peer-to-peer (P2P) resource sharing platform in the context of a Swedish university, KTH Royal Institute of Technology. KTH is the largest technical university in Sweden and has ambitious sustainable development objectives for the areas: education, research, collaboration, work environment, campus, travel, purchasing and procurement, management of chemical, and organization & management (KTH, 2016a). However, in the sustainability objectives, the word "consumption" appears only three times; all of them referred to "energy consumption." The word "sharing" does not appear on any occasion, and "share" appears in only two opportunities; one referring to energy and another referring to the percentage of people that go to the university in public transport and bicycle. Hence, the university does not contemplate, in any of its sustainability objectives, sharing strategies in order to promote responsible consumption among students and personnel. The study therefore was also a first attempt to initiate efforts towards promoting more sustainable consumption patterns among students and personnel at the university. University communities have the suitable context for sharing economy activities to flourish - sense of collectiveness, local proximity and trust among peers, students need temporary access to daily life times, etc. (Ertz et al., 2016; Schaeffers et al., 2016).

In this sharing platform, students and staff of the university could (a) lend and borrow consumer goods from each other, and (b) offer and access services. We investigated the motivations, barriers, desired types of assets and services, and preferred mode of

trading (e.g. monetary or points exchange). A qualitative elicitation study preceded a quantitative survey. The pre-study formed the basis to postulate a set of 13 main hypotheses. We used multilinear regressions to analyse the results.

2. Theoretical background

2.1. Online peer-to-peer resource sharing

Many terms have been utilized to capture and define the modern sharing phenomenon most often interchangeably (Laurenti et al., 2019). For example, sharing economy (Frenken and Schor, 2017), collaborative consumption (Botsman and Rogers, 2011), access-based economy (Bardhi and Eckhardt, 2012), peer-to-peer sharing (Hawlitschek et al., 2018) are some of the terms used. The variety naming mirrors the various business models of online resources sharing platforms (Ranjbari et al., 2018). A recent study (Wirtz et al., 2019) has used two dimensions, (a) access provision vs transfer of ownership, and (b) peer-to-peer vs platform-provided assets, to define sharing economy business models. The authors consider sharing economy platforms as only those that provide access to assets, resources and services without the transfer of ownership either P2P- or marketer-provided resources. We expand this scope to include services and the compensation scheme of the sharing transaction ‘monetary’ and ‘nonmonetary’ as the focus of this study (top right quadrant in Figure 1).

Figure 1 - Separating the platform dimensions of resource provider, asset provision vs ownership transfer, and compensation scheme.

A cornerstone communality in these platform business models (and difference from their respective traditional incumbents) is that they operate via an online platform that make locating assets and resources, exchanging, reserving and using them, and making payment convenient and seamless.

2.2. Models of consumer behaviour

Various theories have been developed over the years to try to explain the behaviour of the human being. However, it is essential to note that not all behaviour can be categorized in the same way. For example, nobody finds it strange to understand that repetitive actions such as brushing teeth and eating breakfast do not seem to have the same causes as proposing marriage or traveling abroad. So, in order to try to explain behaviour, it is a priority first to categorize it. As the present research seeks, *inter alia*, to explore the reasons for and against to provide and access products and services, it is crucial to understand what factors affect consumer behaviour concerning consumption.

One of the best-known models to explain consumption behaviour is the "Rational Choice Model" (Homans, 1961). According to this model, consumers acquire products or services by analysing individual costs and benefits of different decisions and end up finally choosing the selection that provides the highest net benefits (Jackson, 2005). This model has undergone considerable criticism. First, establish cognitive processes is challenging at all times (Smith, 1991). The evidence suggests that people tend to take mental shortcuts through the creation of routines and habits that make it difficult for a behaviour to change (Corsini et al., 2019), thus evading cognitive processes (Dietz and Stern, 1995). Secondly, feelings hardly can be separated from cognitive processes (Nespor, 1987). Third, consumer behaviour often involves the consumer's values, which may differ from rational analysis (Sarti et al., 2017).

The so-called adjusted expectancy-value theories (Wigfield and Eccles, 2000) offered more holistic explanations to the "Rational Choice Model". The "Simple Expectancy-Value Attitude Theory" establishes that consumption behaviour is exclusively bound to the expectations of the consumer (Jackson, 2005). The consumer's attitude construct is the summation of the beliefs weighted by evaluations of the product's characteristics.

The "Means-End Chain Theory" (Gutman, 1982) intended to be a more qualitative than the previous models. The theory postulates that consumer behaviour is based on the achievement of goals; that is, the consumer acquires items to fulfil personal objectives through the characteristics of the product (Babin et al., 2019). The model has a relationship with the "rational choice model" but also adds the consumer's values and their attitude in this regard (Hosany et al., 2019). The application of this model also have drawbacks. First, it requires laddering interviews which can be extremely time-consuming; and secondly the predictive power of the model can be significantly compromised by several factors, such as lack of an established theoretical framework, sample features, data collection procedures, and analysis methods (Costa et al., 2004).

One of the most commonly applied behavioural theories in the field of environmental psychology is Theory of Planned Behaviour (TPB) (Ajzen, 1991, 1985) by Icek Ajzen (Eom et al., 2019). The TPB is an extension of the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975). These theories postulate that the intention to perform the behaviour is a main determinant of the actual behaviour. Behavioural intention is determined by the attitude towards the behaviour and subjective norms (Fishbein and Ajzen, 1975). The attitude component is the personal perception that a person has about something and can be positive, negative, or indifferent (Ajzen, 1991). In this way, the attitude construct relates to the advantages and disadvantages offered by that behaviour. Subjective norms relate to the unwritten rules of society (Feola and Binder, 2010). It

refers to all those behaviours that, despite not being formally documented, the individual is aware that they are accepted or not and there is, therefore, a social burden to execute it or not (Ajzen, 1991). A classic example of subjective norms is usually the need to smoke or drink alcohol to be accepted in a group (Mcmillan and Conner, 2003). Finally, the perceived behavioural control (only in the TPB) refers to the perception about how easy or difficult is to perform the behaviour (Madden et al., 1992). Figure 2 illustrates how the TPB model.

Figure 2 - Conceptual model of the Theory of Planned Behaviour (Ajzen, 1991).

Despite the long and varied use of the TPB model in different contexts, the model is not without limitations and criticism (Sniehotta et al., 2014). Some mention that the TPB model leaves important components of consumption outside the analysis (Corsini et al., 2019). For example, factors such as the monotony of behaviour (the routine) are exempt (Jackson, 2005). Additionally, normative values do not seem to be fully encompassed when considering attitude (Trafimow and Finlay, 1996). This is important because some behaviours, among which the pro- environmental ones stand out, seem to be based on personal norms rather than attitudes (Feola and Binder, 2010). In fact, socio-psychological evidence shows that some behaviours are not influenced by attitude nor intention (Jackson, 2005). As if that were not enough, sometimes an inverse phenomenon occurs, where the intention ends up affecting the attitude. The theory also does not seem to contemplate changes in behaviour due to exogenous factors either. For example, people can change their attitude and intention regarding recycling due to legal incentives or improvements in the collection system. In this way, people start recycling without having a positive attitude about it but, over time, the recycling behaviour generates a positive attitude towards it (Jackson, 2005).

There have been other behavioural models that considered the normative and moral aspects in a more holistic way, and thus such as the Norm-Activation Theory (Schwartz, 1977) and the Value- Belief-Norm (Stern, 2000). In the Schwartz model, for example, pro-environmental or altruistic behaviour appears when the person's morality is "activated" by means of four factors, among which are feelings of pride or anticipated guilt for the performance of the behaviour (Schwartz, 1977). In Stern's model, behaviour is also driven by morality; which force one to act in a certain way, but personal norms

are activated when people think that violating a norm will have adverse effects on things they value (Stern, 2000). Moral values is antecedent of attitude. Nevertheless, the TPB model can still accommodate other constructs (de Leeuw et al., 2015). Eliciting these constructs for the case of using an online P2P sharing platform is the focus of this paper.

3. Materials and Methods

We adapted the procedure for conducting questionnaires based on the TPB proposed by Francis and colleagues (2004) following the steps:

1. Elicitation study
2. Determination of constructs
3. Development of conceptual model and hypotheses
4. Quantitative survey
5. Pilot test and correction of the questionnaire
6. Verification of reliability and general model considerations

3.1. Elicitation study

The participants were students and staff of the Swedish technical university KTH Royal Institute of Technology. KTH has approximately 13063 full-time students, 67% of whom are men and 33% are women (KTH, 2016b). In terms of employees, the university has 5178 employees - of which 3572 hold full-time positions - approximately 37% are women, and 63% are men. With a total population of 18241 people, the sample size of the project required at least 267 people for a confidence level of 90% and 377 people for a confidence level of 95%. For multilinear regression models under the TPB model, it is reasonable to assume moderate effect size — i.e., adjusted R^2 of around .3 — which requires a sample of at least 160 people (Francis et al., 2004). The use of a peer-to-peer sharing platform for the KTH community was the studied behaviour.

We formulated a qualitative questionnaire with nine open-ended questions covering:

1. behavioural beliefs and outcome evaluations (to measure the attitude) – 3 questions seeking to determine the most frequent advantages and disadvantages of using the (potential) KTH sharing platform.
2. normative beliefs (to measure subjective norms) – 3 questions covering the most influential groups for the respondent.
3. control beliefs and influence of control beliefs (to measure perceived behavioural control) – 3 questions addressing the barriers or prerequisites for using the platform.

The questions can be seen in Table S1 of the supporting information of this article.

The invitation to the elicitation study was made personally and digitally to various students and staff of KTH during February 2019. A total of 15 people was interviewed (40% men and 60% women). Participants could clarify doubts regarding the questions, but under no circumstances they were provided with examples of answers or how to answer the questions, thus avoiding to guide the answers towards one direction or another. A maximum time to answer the questions was not considered, but the interviews lasted 35 minutes on average.

3.2. Determination of constructs

The answers were coded according to similarity. As much as possible, we followed the terminologies and definitions of Hawlitschek and colleagues (2018) to name the codes

in order to allow for future comparisons. A cut-off rule of 25% excluded the least important codes. We followed this procedure for each of the three sections of the qualitative interviews.

For the behavioural beliefs, advantages appeared 49 times while disadvantages 28 times. Advantages such as "to help save the planet," "to generate less environmental impacts" and "to help the environment" were coded under the same construct called "Ecological sustainability." After coding, we ended up with 16 different advantages and disadvantages of using KTH peer-to-peer sharing platform. Then, after applying a cut-off rule of 25% to exclude the least important codes, we ended up with four advantages (social experience, ecological sustainability, financial benefits, sense of belonging) and four disadvantages (process risk concerns, effort expectancy, resource scarcity, trust in others). The responses and codes are available in the supplementary information of this article.

Many influential groups were mentioned, appearing in total 25 times for the students and 16 times for the KTH staff. By applying to cut-off rule of 25%, the groups identified were: friends, teachers, classmates for the students; and boss, head of department, university board for the staff.

Finally, 15 factors related to the prerequisites and barriers to using the KTH peer-to-peer sharing platform were encountered in the interviews. With the 25% cut-off rule, four prerequisites (familiarity, trust in others, social experience, and variety) and three barriers (process risk concern, effort expectancy, and resource scarcity) were nominated.

Table 1 shows the final list of the factors elicited to the quantitative survey (all the factors encountered and their frequency are shown in Table S2-6 of the supporting information of this article).

Table 1 - Elicited factors to the quantitative survey

Abbreviation	Factor name
SE	Social Experience
PRC	Process Risk Concerns
TIO	Trust in Others
ES	Ecological Sustainability
EE	Effort Expectancy
SOB	Sense of Belonging
F	Familiarity
FB	Financial Benefits
RS	Resource Scarcity

V	Variety
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3.3. Development of conceptual model and hypotheses

Figure 3 illustrate the conceptual model developed from the elicitation study. Our model integrates a broad set of potential motives and hinders through the conceptualization of the TPB constructs (attitude, subjective norm, and perceived behavioural control). With this model it was possible to investigate the relative importance of the motives and hinders to the TPB's constructs.

Figure 3 - Conceptual behavioural model developed from the elicitation study.

Table 2 shows the stated hypotheses. Detailed explanation on the rationale for stating them are found in Section 4 of the supporting information of this article.

Table 2 - List of hypotheses tested in the qualitative

Designator	Statement
+H ₁	Financial benefits have a positive impact on attitude towards peer-to-peer.
+H ₂	Social experience has a positive impact on attitude towards peer-to-peer.
+H ₃	Sense of belonging has a positive impact on attitude towards peer-to-peer.

+H ₄	Ecological sustainability has a positive impact on attitude towards peer-to-peer.
+H ₅	Variety has a positive impact on attitude towards peer-to-peer.
-H _{6a} -H _{6b}	Process risk concerns have a negative impact on: a) attitude towards peer-to-peer b) perceived behavioural control.
-H ₇	Resource scarcity has a negative impact on attitude towards peer-to-peer.
-H ₈	Effort expectancy has a negative impact on attitude towards peer-to-peer.
+H _{9a} +H _{9b}	Familiarity has a positive impact on: a) attitude towards peer-to-peer b) perceived behavioural control
+H _{10a} +H _{10b}	Trust in other users has a positive impact on: a) attitude towards peer-to-peer b) perceived behavioural control
+H ₁₁	Attitude has a positive influence on the behavioural intention to use peer-to-peer
+H ₁₂	Subjective norms have a positive influence on the behavioural intention to use peer-to-peer
+H ₁₃	Perceived behavioural control has a positive influence on the behavioural intention to use peer-to-peer

3.4. Quantitative survey

The quantitative questionnaire was divided in for parts: (1) questions on the psychological determinants of behaviour; (2) items willing to provide to and access from the sharing platform; (3) preferred system of exchange; and (4) structural and demographical variables. The questions on the psychological determinants of behaviour were a translation of the constructs of the behavioural model following the recommendations of Francis and colleagues (2004). Behavioural intention (BI), attitude (ATT) and perceived behavioural control were measured on a seven-point Likert scale. Subjective norms (SN) had two components, normative beliefs and motivation to comply. Normative beliefs were measured using a unipolar Likert scale of 7 points with three questions from "not at all" to "very much"; and motivation to comply were assessed under indirect measurement using a bipolar Likert scale of 7 points — ranging from -3 to +3 — with three questions that went from "strongly disagree" to "strongly agree". For each normative belief, the belief score was multiplied by the respective

motivation to comply score. The resulting summed products across all the beliefs composed an overall subjective norm score. Table 3 shows the constructs, questions and scales that that composed the quantitative questionnaire.

Table 3 – Quantitative questionnaire used in the study.

Construct	Question	Scale
BI	If KTH Sharing Platform is developed, I... BI1. Intend to use it. BI2. Want to use it. BI3. Expect to give it a try.	Unipolar Likert from 1 (strongly disagree) to 7 (strongly agree).
ATT	ATT1. Using the platform could be extremely harmful / extremely beneficial. ATT2. Using the platform could be a very good idea / a very bad idea. ATT3. Using the platform could be extremely disadvantageous / extremely advantageous. ATT4. Using the platform could be extremely useful / extremely worthless.	Unipolar Likert from 1 to 7.
SN	<i>Normative beliefs component</i> <i>Staff version</i> My boss would ... me using this platform. Head of departments would ... me using this platform. The University Board would ... me using this platform. <i>Student version</i> My friends think I ... use this platform. Teachers would ... using this platform. Classmates would ... using this platform.	Unipolar Likert from 1 (strongly disapprove) to 7 (strongly approve).
	<i>Motivation to comply component</i> When it comes to matters of using the KTH Sharing platform... <i>Staff version</i> What my boss thinks I should do is important to me. What the head of departments advise to do is important to me.	Bipolar Likert scale of 7 points from -3 (not at all) to +3 (very much).

	<p>What the University Board suggests to do is important to me.</p> <p><i>Student version</i></p> <p>What my friends think is important to me.</p> <p>What teachers suggest is important to me.</p> <p>What my classmates say is relevant to me.</p>	
PBC	<p>PBC1. I am confident that I could use the platform if I wanted to (Strongly disagree / Strongly agree).</p> <p>PBC2. When to use the platform or not is entirely up to me (Strongly disagree / Strongly agree).</p> <p>PBC3. Making the decision to use the platform is (Very easy / Very difficult).</p> <p>PBC4. Deciding when to use or not use the platform could be (Very easy / Very difficult).</p>	Unipolar Likert from 1 to 7.
F	F1. I am familiar with P2P online sharing platforms.	Unipolar Likert from 1 (strongly disagree) to 7 (strongly agree).
TIO	<p>TIO1. Students and KTH staff are trustworthy.</p> <p>TIO2. I have more confidence in students and KTH staff than in strangers.</p> <p>TIO3. Students and KTH staff keep promises and commitments.</p>	
FB	<p>If I used the KTH Sharing Platform, I could...</p> <p>FB1. Save money.</p> <p>FB2. Lower my expenses.</p> <p>FB3. Have more money to spend on other things.</p>	
V	V1. KTH Sharing Platform could give access to large number of products and services.	
SE	<p>With the KTH sharing platform, I could...</p> <p>SE1. Learn new things</p> <p>SE2. Meet new people</p>	
PRC	<p>The KTH sharing platform could...</p> <p>PRC1. Constitute a legal risk to me</p> <p>PRC2. Constitute an economic risk to me</p> <p>PRC3. Cause any other type of risk when I use it</p>	
RS	When using the KTH sharing economy platform, it could be possible that...	

	RS1. I won't be able to get a product/service when I want to use it. RS2. The product/service does not exist.	
ES	KTH sharing platform could allow me... ES1. Help save natural resources. ES2. To be environmentally friendly. ES3. To have a sustainable way of consumption.	
SOB	KTH sharing platform could... SOB1. Strength relationships between students. SOB2. Generate a good bond between students. SOB3. Help integration for students.	
EE	KTH sharing economy could... EE1. Be time consuming. EE2. Demand me effort. EE3. Demand to plan things in advance.	

Part 2 and 3 of the survey had multiple-choice questions with drop-down answers. These questions focused on the preference of the future users concerning products/services that they would like to have access to, products/services that they would like to offer and preferred platform system (Table 4).

Table 4 – Questions addressing the types of products and services students and staff are willing to provide and access in the platform, and preferred mode of exchange.

Question	Option
Which products/services would you like to have access to from the platform? Which products/services would you be willing to provide	<ul style="list-style-type: none"> • Services in general (teaching assistance, language lessons, baby-sitting, etc). • Tools (hammer, screwdriver, drill, etc). • Car-sharing. • Accommodation. • Study materials (books, workbooks, laptop, etc).

	<ul style="list-style-type: none"> • Leisure items (camera, clothes, sports equipment). • Food. • Other.
What format would you like the platform to have?	<ul style="list-style-type: none"> • Monetary system - Exchanges are paid with money. • Point system - Points are used as a currency instead of money. Suppliers and users earn and spend points as they lend or acquire products and services. • Hybrid system - Points can be used as cash. • Free system - The provider defines how he/she wants to be paid for the product or service (money, points or free of charge). • Monthly subscription to access products and services - Similar to Netflix. • Indifferent.

Structural and demographical variables, in part 4, were questions addressing gender, age, nationality, and school to which the participant belongs at the end of the questionnaire.

The questionnaire was tested during the third week of March 2019 by six participants of the elicitation study and improved where necessary. The questionnaire was tailored to students and personal accordingly to the respective important groups (e.g. friends, family, boss). The final version of the survey was implemented in the APSIS PRO software.

3.5. Data analysis

After internal consistency checks, 325 responses (out from 387 completed questionnaires) were considered valid. 70% of the valid respondents were between 20 and 39 years old; 79% were employees and 31% students; 62.5% were male; 40% were from the School of Architecture and the Built Environment. Complete information about the structural and demographic information is available in Tables S7-10 of the supporting information of this article.

With the population of the valid responses, we performed:

1. reliability tests to verify the internal consistency of the questionnaire;

2. multilinear regressions (MLRs) to test the hypotheses of the study and to determine the strength of the relationships between the variables of the conceptual model and (see Figure 2); and
3. multivariate statistical tests to assess demographical differences in the responses.

We used the software RStudio version 1.1.463 for analysing the data.

Reliability tests

All constructs had Cronbach's alpha of .70 or higher, indicating their reliability. Kaiser-Meyer-Olkin test (measure of sample adequacy) gave a meritorious result of .870 with significance level lower than .001. Harman's single test factor gave a total change in the variance of 29.10% after the extraction of a factor, a value well below the recommended 50% (Podsakoff et al., 2003); thus, common bias was not a concern in the study. The internal consistency reliability (ICR) of the factors were all above the recommended minimum of .70 and therefore, demonstrating composite reliability (Netemeyer et al., 2012).

Convergent and discriminant validity tests showed that all square roots of all AVE values exceed their correlation with other constructs (Fornell-Larcker criterion) except for one. The problem occurs for the SOB and SE constructs, which converge to the same criterion. The latter can be explained due to the excessive similarity of SOB and SE and the fact that, since the sharing platform is not in operation, the respondents were not able to establish a clear difference between both constructs. Whatever the case, it was decided to keep both constructs for the MLR model of ATT. Given the convergence of both constructs, it was expected that one of them had a non-standardized coefficient very close to 0 and a p-value considerably greater than .05, which was later checked in the model. Except for the convergence, the smallest AVE occurs for PBC (AVE = .487) slightly below the conventional limit of .50. However, by eliminating questions PBC1 and PBC2 to gain IRC and composite reliability, it was not possible to reach convergence after 25 interactions. Therefore, since the AVE value is slightly less than .50, but the composite reliability of the factor is more significant than .60 (CR = .78), the convergent validity of the construct was still adequate (Tabachnick and Fidell, 2012).

Multilinear regression

Three MLR models were developed:

1. PBC, SN, and ATT as explanatory (independent) variables for BI (dependent variable).
2. SE, PRC, TIO, ES, EE, SOB, F, FB, RS, and V as explanatory variables for ATT; and
3. F, TIO, and PRC as explanatory variables for PBC (dependent variable).

For each model, we analysed the R-squared (R^2), p-values, Pearson's correlation coefficients and their interpretation for the test of the hypotheses. R^2 is a statistical measure that represents the proportion of the variance for the dependent variable that's explained by the independent variables in the regression models; the p-value for each independent variable tests the null hypothesis that the variable has no correlation with the dependent variable (a p-value lower than .05 indicates a statistical significant

correlation); finally, the Pearson's correlation coefficient shows the strength of the linear relationship between the dependent and an independent variable.

Information on the means, standard deviation, minimum and maximum values for the constructs of the behavioural model are in Table S11 of the supporting information of this article.

4. Results

4.1 Determinants of behavioural intention

A multiple linear regression was calculated to predict BI based on their ATT, SN and PBC. A significant regression equation was found with R^2 of .395 (adj .388). Participants' predicted BI is equal to $.366 + .676 (\text{ATT}) + .011 (\text{SN}) + .218 (\text{PBC})$, where ATT and PBC are measured in 1-7 Likert scale; SN are measured as the sum of the product of three questions in a 1-7 Likert scale and three questions in a -3 to +3 scale, hence possible values range from -63 to +63. Participants BI increased .676, .011 and .218 point for each point of ATT, SN and PBC respectively.

Pearson's r coefficients were also computed to assess the strength of the linear relationship between BI and these three predictors. There was positive correlation between BI and ATT ($r = .592$), SN ($r = .368$), and PBC ($r = .385$). The significance levels for each of the factors are below $p = .05$, validating hypotheses H_{11-13} . This is consistent with the previous literature on consumer motives for P2P sharing suggesting that attitude has the greatest effect on intention (Hawllitschek et al., 2018).

4.2. Factors influencing attitude

A multiple linear regression was calculated to predict ATT based on their F, TIO, FB, V, SE, PRC, RS, ES, SOB and EE. These 10 predictors of ATT could predict 49.2% (R^2 .492) of the variance (adj .476). However, the p -value for financial benefits (FB) and social experience (SE) were above 0.05, thus, rejecting hypothesis H_1 and H_2 . In the case of SE, this was expected due to the convergence of validity with sense of belonging (SOB). Therefore, the model should not have significant variations in case of only considering SOB and excluding SE. Thus, we excluded SE as a predictor. Under this new model, R^2 remains unchanged = .492 and adjusted R^2 presents a small variation of .02 (adjusted $R^2 = .478$).

Pearson's r coefficients were also computed to assess the relationship between ATT and these eight predictors. There was positive correlation between ATT and SOB ($r = .478$), ES ($r = .519$), V ($r = .359$), F ($r = .359$), TIO ($r = .407$); the correlation is significant at the 0.01 level, thus validating hypotheses H_3 , H_4 , H_5 , H_{9a} and H_{10a} respectively. Moreover, there was a negative correlation between ATT and PRC ($r = -.266$) at a significant at the 0.01 level, validating hypothesis H_{6a} . The correlation between ATT and EE, and ATT and RS was not significant at the 0.01 level; therefore, H_8 and H_7 could not be confirmed.

In this way, a variation of 47.8% of the attitude can be explained by six predictors. Participants' predicted ATT is then equal to $2.076 + .109 (F) + .151 (TIO) + .073 (V) - .132 (PRC) + .187 (ES) + .158 (SOB)$, where all these predictors are measured in 1-7 Likert scale.

4.3. Influence of control beliefs

F, TIO and PRC predicts only 12% (adj R^2 .12) of the variation in the multiple linear regression computed for PBC. The p-value for TIO was above .05 therefore excluded from the regression equation; hypothesis H_{10b} was rejected because of the high p-value. In this way, participants predicted PBC is equal to $5.061 + .118 (F) - .199 (PRC)$, where F and PRC are measured in 1-7 Likert scale. Participants PBC increased .118 and decreased .199 . point for each point of F and PRC respectively.

Pearson' r coefficient indicated the existence of a statistically significant relationship between PBC and F ($r = .240$) and PBC and PRC ($r = -.280$), validating hypotheses H_{9b} and H_{6b} .

The PBC model presented a low $R^2 = .13$ and adjusted $R^2 = .12$. In this way, only 12% of the variation of PBC was explained by the constructs of F, TIO, and PRC (**Error! Reference source not found.**). From the non-standardized coefficients, a negative value was seen for PRC and positive values for F and TIO. The largest absolute increases were for PRC and F, whose increases in a value of 1 produce absolute increases of .2 and .12 in the PBC respectively. Since the significance level was less than $p = .05$ for F and PRC, the hypotheses H_{9b} and H_{6b} were validated. In the case of TIO, the significance level was notoriously high ($p = .303$) and therefore, the null hypothesis was rejected, and the hypothesis H_{10b} was invalidated. Pearson's correlation coefficients indicated moderate and statistically significant correlations for F and PRC with PCC values equal to 0.24 and -0.28 respectively.

4.4. Summary of the MLR models for hypothesis test

Table 5 presents a summary of the results for the study' hypotheses.

Table 5 - Summary of the validation of the hypotheses of the behavioural model of the study.

#	Description	Result	Result description	Conclusion
+H ₁	FB have a positive influence on ATT.	p-value > .05	FB does not influence ATT.	H ₁ rejected.
+H ₂	SE has a positive influence on ATT.	Not tested	Hypothesis not tested due to convergence.	None.
+H ₃	SOB has a positive influence on ATT.	p-value < .05	SOB influences ATT positively.	H ₃ validated.
+H ₄	ES has a positive influence on ATT.	p-value < .05	ES influences attitude positively.	H ₄ validated.
+H ₅	V has a positive influence on ATT.	p-value < .05	V influences ATT positively.	H ₅ validated.

-H _{6a}	PRC have a negative influence on ATT.	p-value < .05	PRC influences ATT negatively.	H _{6a} validated.
-H _{6b}	PRC have a negative influence on PBC.	p-value < .05	PRC influences PBC negatively.	H _{6b} validated.
-H ₇	RS has a negative influence on ATT.	p-value $\approx$.05	RS does not influence attitude.	H ₇ rejected.
-H ₈	EE has a negative influence on ATT.	p-value < .05	EE influences ATT negatively.	H ₈ validated.
+H _{9a}	F has a positive influence on ATT.	p-value < .05	F influences ATT positively.	H _{9a} validated.
+H _{9b}	F has positive influence on PBC.	p-value < .05	F influences PBC positively.	H _{9b} validated.
+H _{10a}	TIO has a positive influence on ATT.	p-value < .05	TIO influences ATT positively.	H _{10a} validated.
+H _{10b}	TIO has a positive influence on PBC.	p-value > .05	TIO does not influence PBC.	H _{10b} rejected.
+H ₁₁	ATT has a positive influence on BI.	p-value < .05	ATT influences BI positively.	H ₁₁ validated.
+H ₁₂	SN have a positive influence on BI.	p-value < .05	SN influence BI positively.	H ₁₂ validated.
+H ₁₃	PBC has a positive influence on BI.	p-value < .05	PBC influences BI positively.	H ₁₃ validated.

4.5. Sharing potential

Takers

Services in general had the highest demanded item among the respondents. 77.23% expressed interest in having access to services from the KTH peer-to-peer sharing platform. Closely in second place appears study materials with 69.23% of respondents. Leisure items and tools were virtually tied (65.85% and 65.23% respectively). Accommodation appeared only in fifth place with 59.69%. Very lagging appear car-sharing and food, which only had 41.84% and 25.54% respectively. In this way, it can be inferred that these last two products do not interest the study population, and its incorporation into the platform would not be advisable. Remarkably, having access to car-sharing and food had the least popularity among both students and staff. The ordering from the first to the fourth desired product varied slightly between both groups

of respondents, being study materials the most desired product for the students, while for the staff were services in general.

Providers

The product with the most significant number of possible providers was services in general with 64.65% of the respondents. Services such as language classes, school help, or cooking classes, could be the most straightforward for both provider and taker since they do not involve risks of theft or damage. Study materials appeared as the second most popular items among providers (58.15%). Finally, leisure items and tools tied in third place with 50.46% of respondents.

Comparing the responses of students and staff as potential providers, students were evidently more interested in providing study materials and services, while staff had a larger preference for providing services in general. Both groups showed the least interest in providing car-sharing (8.92%). Intriguingly, the popularity of providing food (22%) was as equal as of providing accommodation for both students and staff.

Asymmetries in supply & demand

We found an asymmetric ratio between supply and demand. The most significant difference was in products that are difficult to access, such as accommodation and cars. Thus, only 21.54% of the respondents were interested in providing accommodation (versus 60% who were interested in having access) and 8.92% in providing cars for car-sharing (versus 42% that expressed interest in having access to a car from a KTH peer).

Detailed information about the supply-demand potential and asymmetries are in Table S12 of the supporting information material of this article.

4.6. Preferred system of exchange

51.69% of the respondents expressed that they would prefer the KTH sharing platform to operate in a choice-free system of exchange; that is, a system in which the provider determines the form of payment; which can be monetary, by points, free of charge or through a pure exchange - such as service by service, product by product or a combination of these. In second place with 37.54% of respondents wanting a hybrid system between monetary and point exchange; in this hybrid system users could pay for the exchange both in cash or with points (similar to bitcoin). Under this system, both supplier and consumer earn points through the provision or consumption of an item, points that later can be used instead of cash. Close in third place was the monetary system 32% of preference. Although this system is the simplest to implement of all, it would have the highest probability to lead to the so called environmental rebound effects. Far in fourth place was the point system - which does not contemplate the payment in cash - with 24% of respondents opting for this system. 12.62% were indifferent to the system, and only 8.62% were interested in a subscription system similar to the one offered by Netflix or Spotify. Intriguingly, students and staff, there are no significant differences when choosing the design of the platform. Both groups share the same preference in the same order.

5. Conclusion

This study explored psychological antecedents of behavioural intention towards using an online P2P resource sharing platform in a Swedish university setting. The university has ambitious environmental objectives but none addresses sustainable consumption among students and staff. We developed a behavioural model from a qualitative elicitation study based on the TPB constructs. Attitude towards the platform, subjective norms and perceived behavioural control explained 39% of the variance of behavioural intention. Attitude had the strongest effects on behavioural intention, followed by the perceived behavioural control and subjective norms. Among the key determinants of attitude, ecological sustainability, followed by sense of belonging, trust in others, and familiarity were the most important predictors. Conversely, process risk concerns had the strongest negative effect on attitude, while effort expectancy, resource scarcity, and financial benefits showed to have no significant effects on the user's attitude.

We also investigated preferred categories of products & services to offer and access as well as the desired system of exchange. Services in general and study materials appear as the items that both students and staff of the university most want to provide and have access to. Besides, both items had the most significant number of dual role users (i.e. users intending to consume and provide). The preferred mode of exchange for the platform is a free system (which includes donation and second-hand sales). A hybrid system, in which users could choose points (e.g. tokens) or money in the transactions, was the second preferred system and may present significant advantages for implementation.

When interpreting the results of this study, a few limitations should be acknowledged and may lead to several avenues for further research. First, the results are not generalisable to other contexts as this study investigates the intention to use a P2P resource sharing platform restricts to the university community. Secondly, this study adopted the TPB model; although this framework undoubtedly casts relevant light on the research related to the P2P resource sharing, alternative theoretical lenses should be systematically explored to account for more variance of users' intention to participate in the sharing economy. Third, the survey had only 325 valid responses; future surveys should consider giving small rewards, such as lottery of cinema tickets, to increase the number of respondents. Finally, our study looked at users' intentions and no inference to actual behaviour is possible to draw.

The sharing economy movement has been characterised by many promises and paradoxes, especially when large venture capital investments are involved. Nevertheless, many of the negative effects may not exist due to the intrinsic characteristics of university communities (e.g. trust, geographical proximity of users, sense of belonging). Therefore, implementing a P2P resource sharing platform in universities may present a viable way to infiltrate a sharing culture and sustainable consumption in society.

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