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Analysing user preferences for co-working space characteristics

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ABSTRACT

Over the past decades, the use of mobile technology has increased and the attitude towards work has changed, making it possible to work anywhere at any time. However, workers still seek work environments that stimulate networking and collaboration possibilities. This has led to the growing popularity of co-working spaces. However, little is known about the specific preferences of co-working space users. The aim of this research is to analyse user preferences for co-working space characteristics. Stated choice data were collected by means of a questionnaire which was completed by 219 respondents of 25 co-working spaces in the Netherlands. A mixed-multinomial logit model was used to analyse the user preferences. Results show that the main motivations for co-workers to work in a co-working space were that they were looking for a workplace outside their home that allows them to work in an inspiring work environment where the accommodation is affordable. Accessibility and atmosphere/interior are the most important characteristics when choosing a specific co-working space. These results provide owners or managers of co-working spaces with clear insights about how to cope with co-worker preferences by offering co-working spaces with good accessibility by car and public transport, a semi-open layout and a homelike interior.

KEYWORDS

co-working; mixed-logit model; multi-tenant offices; offices; stated-choice method; user preferences; workplace design

Introduction

Several market changes have led to the growth of new types of multi-tenant offices, such as new ways of working (Van Meel & Vos, 2001), the sharing economy (Bouncken & Reuschl, 2016), the increasing need for flexibility (Gibson & Lizieri, 1999; Laterveer, 2011), the increasing use for public spaces as work spaces (Fruianu, De Leeuw, & Nilsen, 2011), the increasing number of self-employed workers, the growth in the use of technologies, and the decreasing and changing need for office space (Ketting, 2014; Laterveer, 2011). A multi-tenant office can be described as a building in which office space and possibly a number of shared facilities and/or services are offered to multiple organizations (Calder & Courtney, 1992; Weijs-Perrée, Appel-Meulenbroek, de Vries, & Romme, 2016). Previous studies (*e.g.* Calder & Courtney, 1992; Ketting, 2014; Parrino, 2015; Van den Berg & Stijnenbosch, 2009; Weijs-Perrée et al., 2016) classified multi-tenant offices into several subgroups, namely serviced offices (offering workspaces with a high service level), incubators (offering a high service level that could help start-up enterprises, mostly high-tech enterprises, to develop and become successful), regular business centres (focusing on offering workspaces without any additional facilities or services) and co-working spaces (offering workspaces with a high service level and focusing on creating a community).

The popularity of co-working spaces has increased over the past years (*e.g.* Huwart, Dichter, & Vanrie, 2012; Moriset, 2013; Parrino, 2015). Co-working spaces are dynamic, inspiring and low-cost workplaces where people (from different business backgrounds) can interact, share knowledge and co-create (Fuzi, 2015; Spinuzzi, 2012). Their popularity is the result of 'a shifting attitude towards work' (Sykes, 2014, p. 142), namely self-employed people and other individual professionals are increasingly looking for a workspace outside their home because they feel lonely when at home and want a better balance between their work and personal life (Fuzi, Clifton, & Loudon, 2014; Moriset, 2013).

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Co-working is often associated with freelancers and self-employed workers (Parrino, 2015). However, according to multiple studies (*e.g.* Fuzi, 2015; Merkel, 2015; Parrino, 2015; Sykes, 2014), several users can be distinguished, namely self-employed workers, small firms, large firms, extended workers and students. Users of co-working spaces value working in a co-working space because of casual small talk, knowledge sharing and brainstorming with other co-workers (*Deskmag*, 2015). Co-working spaces increase a user's self-efficacy and performance by creating a better balance between work and private life and because of the easy access to a community and professional and social networks (Bouncken & Reuschl, 2016).

Although several non-scientific journals and reports discussed co-working by addressing questions such as what is co-working, who co-works and where does it happen, the academic literature and quantitative research on this subject are still limited (Corenet Global, 2016; Leclercq-Vandelannoitte & Isaac, 2016; Merkel, 2015; Moriset, 2013). Some previous studies focus on specific subjects of co-working, such as knowledge dynamics in co-working spaces (Capdevila, 2013; Parrino, 2015), contribution of co-working to the creativity of the city, economic growth and sustaining productivity and innovation (Deijl, 2011; Moriset, 2013), and promoting entrepreneurship by co-working spaces (Fuzi, 2015). However, still little is known about the preferences of users of co-working spaces. Research on user preferences of co-working space characteristics is needed, so that owners/managers can optimally respond to these preferences and create co-working spaces that attract more tenants in an increasingly competitive growth market. Therefore, the aim of this study is to analyse the user preferences of co-working space characteristics and the influence of user characteristics on these preferences in order to provide owners/managers with tools to improve their competitive position.

The paper is structured as follows. The next section discusses the relevant literature on co-working spaces and user preferences. The methods section then presents the sample, the data-collection procedure and the analyses method used. The results are then explained, followed by the conclusions and discussion.

Co-working spaces

Users of a co-working space

Co-working spaces mainly focus on creating a community, interconnecting and inspiring tenants who generally work alone (Garrett, Spreitzer, & Bacevice, 2017; Johns & Gratton, 2013; Moriset, 2013). These workspaces are easily accessible and low cost, where a heterogeneous group of workers work in a flexible work environment (Balakrishnan, Muthaly, & Leenders, 2016; Spinuzzi, 2012). Social interactions between tenants are mostly stimulated by hosts or managers who facilitate social events (Parrino, 2015). The most common user groups of co-working spaces are self-employed workers, entrepreneurs and freelancers, but also extended workers, small and medium-sized enterprises (SMEs), students and employees of large firms are the target groups of co-working spaces (Capdevila, 2013; Fuzi, 2015; Gandini, 2015; Merkel, 2015; Moriset, 2013; Parrino, 2015; Spinuzzi, 2012; Sykes, 2014).

Motivations to work in a co-working space

The first co-working space, the Spiral Muse Coworking group, was started in San Francisco in 2005 by Brad Neuberg (Leclercq-Vandelannoitte & Isaac, 2016; Merkel, 2015; Spinuzzi, 2012). Since 2005, the popularity of co-working spaces has increased (Balakrishnan et al., 2016). This was a result of the awareness of the disadvantages of working in a classic office, at home or at the local café (Fuzi et al., 2014; Rus & Orel, 2015), such as the possible lack of social and professional interaction, isolation, and the blurred boundary between a private and a professional life (Leclercq-Vandelannoitte & Isaac, 2016; Waber, Magnolfi, & Lindsay, 2014). Kojo and Nenonen (2017) suggested that the main drivers for the evolution of co-working spaces were new ways of working, attractiveness (*i.e.* increasing demand for more than only a workspace at a good location), work/life balance, economic efficiency (*i.e.* flexible and short-term lease contracts) and sustainability (*i.e.* sharing facilities, equipment and services).

Co-working space characteristics

Kojo and Nenonen (2016) identified six types of co-working spaces based on the business model and level of user access, namely: public offices (*i.e.* free co-working spaces, such as libraries), third places (*i.e.* public spaces that require the purchasing of services, such as cafés), collaboration hubs (*i.e.* public offices that focus on collaboration between workers), co-working hotels (*i.e.* shared office space with a short-lease contract and a compact service package), incubators (*i.e.* shared office space that focuses on entrepreneurship), and shared studios (*i.e.* shared offices where an organization or entrepreneur rents an office space based on flexible-lease contracts, with tenant requirements such as the fit to the community). In this study, only users of co-working hotels and shared studios and not public spaces such as third places, collaboration hubs or libraries are taken into

account. The main focus of these public places is not to provide workspaces for co-workers and there is no rental contract. As this study aims to help co-working office providers to improve their competitive position, these public offices are not taken into account. Incubators are also not considered in this study because these are a very specific and mostly publicly funded type of multi-tenant office that focuses on supporting start-up enterprises (Weijs-Perrée et al., 2016).

Although there are several types of co-working spaces, they share the same core values, namely: collaboration, community, accessibility, sustainability and openness (Kwiatkowski & Buczynski, 2011). Collaboration refers to working together with other co-workers. In addition, at a co-working space, because of its open-work environment, spontaneous interactions frequently occur between users (Gerdenitsch, Scheel, Andorfer, & Korunka, 2016; Hillman, 2011; Roth & Mirchandani, 2016). Sometimes a co-working host is assigned to create a good atmosphere and stimulate interaction, networking and collaboration between co-workers (Fuzi, 2015).

Furthermore, co-working spaces are community-driven environments where co-workers can improve themselves with the help of other co-workers (Sykes, 2014). The main value of the community is that it is open and accessible to everyone. In this community, co-workers can find other people, ideas and other resources, share experiences, learn from each other and celebrate each other's successes (Moriset, 2013; Waters-Lynch & Potts, 2017). Furthermore, several co-working space providers offer co-working space at multiple locations. Therefore, independent professionals have the flexibility to choose where to work (Deijl, 2011; Fuzi, 2015; Merkel, 2015; Spinuzzi, 2012). In addition, co-working spaces are accessible because office space is mostly offered based on low rental prices and flexible rental contracts, such as a rental period for a day, a week or a month (Sykes, 2014).

A typical co-working space combines informal and creative spaces with elements of a workspace (functional spaces) (Orel, 2015). The classical physical design of a co-working space is an open-floor plan with shared workspaces where co-workers can easily interact with each other. This multi-tenant office concept offers, compared with traditional multi-tenant offices, more informal spaces/facilities such as coffee corners, a kitchen, meeting rooms, 24/7 access, internet access, printer and copying facilities, lounge space and other informal spaces (*e.g.* Kojo & Nenonen, 2014; Schöpfel, Roche, & Hubert, 2015; Spinuzzi, 2012; Sykes, 2014). Table 1 shows the typical co-working space characteristics mentioned by previous studies. Based on these characteristics, important typical co-working space characteristics are identified in this study and then analysed to measure user preferences for them.

User preferences

Studies that focus specifically on co-working space users are more explorative and mostly discuss the motivations of co-workers to work at a co-working space (Table 2). For example, *Deskmag* (2012) found that for 47% of respondents, rental costs are the most important reason for co-working. In addition, Capdevila (2013) argued that the main factors to consider joining are related to location. Other important motivations for co-workers were that they felt part of a community (*Deskmag*, 2013), and the inspiring and dynamic atmosphere found in co-working spaces (Fuzi, 2015). However, research on users' preferences for characteristics of co-working spaces is still limited. One of the few studies on the characteristics of multi-tenant offices in general focused on user satisfaction, which is related to user preferences (Hartog, Weijs-Perrée, & Appel-Meulenbroek, 2017). Several physical characteristics of multi-tenant offices were divided into 10 important multi-tenant office factors, namely: location, office exterior and division, office decor, facilities and services, seclusion rooms, office leisure, information and communication technology (ICT) and equipment, privacy and office climate. Results showed that users of multi-tenant offices are the least satisfied with the personal control of the indoor climate and most satisfied with the accessibility and availability of fixed workspaces.

Besides the characteristics of the co-working spaces, previous studies also showed evidence for the influence of individual characteristics on user preferences. For example, Rothe, Lindholm, Hyvönen, and Nenonen (2011) showed that individual differences (*i.e.* age, gender, time spent at the office, time spent working individually) influence preferences for several aspects of single-tenant office workspaces. They showed, for example, that younger workers prefer a workplace that stimulates teamwork and older workers prefer personal control of the indoor climate. In addition, they showed that respondents who spend all their working time at the office value most the ability of the work environment to support the image and values of the organization for which they work (Rothe et al., 2011). Furthermore, Remøy and Van der Voordt (2013) showed that the sector of the organization influences user preferences. They showed, for example, that people working in the creative industry prefer a flexible layout with shared areas, meeting spaces and a representative interior for their organization.

Methods

For the purpose of this study, data were collected between October and November 2016 by means of a

Table 1. Overview of the literature that mentioned co-working space characteristics.

	Deijl (2011)	Deskmag (2012)	Deskmag (2013)	Fuzi (2015)	Fuzi et al. (2014)	Gandini (2015)	Kojo and Nenonen (2014)	Leforestier (2009)	Merkel (2015)	Moriset (2013)	Parrino (2015)	Spinuzzi (2012)	Spreitzer, Bacevice, and Garrett (2015)	Sykes (2014)
24-h access								×						
Co-working host						×	×		×			×		
Access to tools, resources and network	×	×	×	×	×		×							
Atmosphere and interior aesthetics	×		×	×	×		×		×	×				
Collaborative spaces					×		×	×					×	×
Concentration rooms		×			×		×	×				×	×	
Diversity of tenants			×		×								×	
Event spaces							×	×						
Flexible (shared) workspaces				×	×	×	×	×			×			
Flexible lease contract	×	×	×	×	×		×		×			×		×
Good accessibility (*e.g.* car and public transport)		×	×											
Kitchen areas	×						×						×	×
Meeting rooms							×							×
Networking events and workshops	×		×	×			×				×		×	
Open layout							×						×	×
Virtual platform					×		×				×			

Table 2. Overview of the literature on motivations for working at a co-working space.

	Capdevila (2015)	Capdevila (2013)	Deijl (2011)	Deskmag (2012)	Deskmag (2013)	Fuzi (2015)	Fuzi et al. (2014)	Gandini (2015)	Kojo and Nenonen (2014)	Leforestier (2009)	Merkel (2015)	Moriset (2013)	Orel (2015)	Parrino (2015)	Spinuzzi (2012)	Spreitzer et al. (2015)	Sykes (2014)
Access to a network of co-workers	×	×				×	×				×			×	×		
Affordable accommodation			×	×	×	×					×				×		×
Collaboration with co-workers			×	×		×	×	×	×	×		×	×	×	×	×	×
Feeling part of a community	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Interaction and social support	×		×	×	×	×	×		×	×	×	×			×		×
Professional support from co-workers			×	×	×	×				×	×				×	×	×
Sharing ideas and knowledge with co-workers	×	×	×	×	×	×	×		×	×	×	×	×	×	×		×
Inspiring and creative atmosphere			×		×	×	×		×		×	×	×				

questionnaire. Co-working spaces were selected by desk research on co-working spaces in the Netherlands. In total, 66 co-working spaces were found online with available contact information. Operators of these co-working spaces were approached by e-mail and asked to distribute the questionnaire among all their tenants (*i.e.* co-workers). Of these co-working spaces, only 25 operators were willing to participate in this research and distributed the questionnaire among their tenants. To increase the response rate, 16 of these co-working spaces were also visited to distribute the questionnaire personally, which was a more effective tactic. A total of 219 respondents filled in the questionnaire.

User characteristics

User characteristics were measured with open- and multiple-choice questions. Respondents were also asked about socio-demographic characteristics including gender, age, nationality, income and education level. Furthermore, they were asked about work-related characteristics. First, respondents were asked to indicate to which user group they belonged. Hereby, the choice options were self-employed worker, freelancer or entrepreneur; employee of a small company (2–10 employees); employee of a medium-sized company (11–50 employees); employee of a large company (more than 50 employees); and student. These user groups were selected based on previous research on co-working spaces (Deijl, 2011; Hartog et al., 2017; Kojo & Nenonen, 2014; Moriset, 2013). Respondents were also asked to indicate their position in the organization whereby they could choose between supporting staff, regular employee, manager, board member/owner or does not apply. The list of sectors the respondents could choose from was based on research by *Deskmag* (2015) and included: consultancy; design; commerce; information technology (IT); art; management; research; education; project management; public relations, marketing, sales, advertising, communication; writing; and other.

Next, respondents were asked about the number of hours they work on average per week at the co-working space and the transport mode (*i.e.* car, bicycle, walking, public transport) they use to travel from their home to the co-working space. Finally, respondents were asked to choose their top three motivations to work at a co-working space. The motivations were adapted from previous studies (Table 2). The motivation for interaction and social support in Table 2 is called social interaction with co-workers. Sharing ideas and knowledge with co-workers and collaboration with co-workers were combined into the possibility for work-related conversations with other co-workers. In addition, several other possible important motivations were included, such as looking for a workplace outside the home, flexibility and professional appearance for the company (*e.g.* Gandini, 2015).

Attribute-based stated-choice experiment

To collect data on user preferences of co-working space characteristics, a stated-choice experiment was used (Hensher & Greene, 2001). In this controlled experiment, individuals are presented hypothetical choice situations with several alternatives (co-working spaces) and asked to indicate what they would choose if the choice alternatives existed in reality (Hensher, Rose, & Greene, 2015). The alternatives are varied in terms of a set of attributes (co-working space characteristics) based on a statistical design. By varying the attributes independently of each other, variability and zero correlations between attributes is guaranteed so that the separate preference values of attributes can be estimated by statistical analysis of the obtained choice data. Stated-choice experiments are proven to be very effective in various other research domains (*e.g.* workspace preferences in activity based offices and housing preferences) (*e.g.* Cornelissen, 2017; Molin, Oppewal, & Timmermans, 1996). Since the choice task forces individuals to make choices, the estimated preferences should be more reliable compared with estimates that a simple preference rating task would yield (Adamowicz, Louviere, & Swait, 1998).

In this study, respondents were asked to choose between alternative co-working spaces (*e.g.* co-working space A, B, C) based on several attributes related to location, office décor, and facilities and services offered. The relevant attributes were identified and for each attribute the attribute levels on which choice alternatives are varied were specified. The complexity of the task increases with the number of attributes. Adamowicz et al. (1998) claim that a number of nine attributes is still feasible for individuals, but fewer makes it easier for them to compare alternatives. Therefore, a selection of the most typical co-working space characteristics was made. Less typical co-working space characteristics were excluded, namely 24-h access, access to tools, resources, and network and virtual platforms. Also, indoor climate was not included as this aspect is not a very typical for multi-tenant offices (De Been & Beijer, 2014; Hartog et al., 2017). Table 3 shows the eight attribute and attribute levels chosen for the choice experiment. Attribute 4 (*i.e.* the diversity in supply spaces) is a combination of several facilities such as collaborative spaces, meeting rooms, event spaces, flexible (shared) spaces and kitchen areas in Table 3.

Experimental design

The experimental design should allow one to estimate the preferences of each attribute (level). A full fractional design is a design where all possible combinations of attribute levels are used to define profiles for alternatives. Since there are eight alternatives with each three levels, this design would result in too many alternatives for the respondents, namely $3^8 = 6{,}561$ alternatives. Therefore, in most studies a fraction of the full factorial design can be taken such that the attributes still vary independently (orthogonal) and the main effects of the attributes can be estimated independently of the (first-order) interaction effects. An orthogonal fraction, consisting of 27 alternatives was selected (Table 3). Each respondent was presented nine choice sets consisting of three alternatives. They were asked to imagine at which co-working space, based on the levels of the eight attributes, they would prefer the most to work at. Each choice set also included a null-alternative 'none of these options', which reflects that the respondent rather would work at home or somewhere else than at these three co-working space types. An example of a choice set is shown in Table 4. Three random versions of choice sets were developed to minimize order effects (Chrzan, 1994). Thus, each respondent was presented version 1, 2 or 3 of the choice set.

Effect coding of attributes was used to make the data suitable for analysis. In this method, two variables are used to code the three levels of each attribute. Of the two variables, the first level of each attribute is coded as {1, 0}, the second attribute level as {0, 1} and the third level as {–1, –1} (the reference group). Coded in this way the estimated (utility) values of the two variables represent the effects of the levels of the attribute on an average.

Table 3. Attributes and levels for co-working space choice experiment.

Attributes	Attribute levels
Accessibility of the location	Level 0: by car and public transport Level 1: by car Level 2: by public transport
Atmosphere and interior aesthetics	Level 0: industrial Level 1: modern Level 2: homelike
Layout of the space	Level 0: open layout (large open workspace) Level 1: semi-open layout (combination of open and closed workspaces) Level 2: closed layout (enclosed and separate workspaces)
Diversity in supply spaces	Level 0: basic co-working space (collaborative workspace, meeting rooms and kitchen areas) Level 1: standard co-working space (collaborative workspace, meeting rooms, kitchen areas and informal spaces) Level 2: premium co-working spaces (collaborative workspace, meeting rooms, kitchen areas, informal spaces, fitness centre and bar)
Reception and hospitality	Level 0: no reception and no host Level 1: reception but no host Level 2: reception and host
Events	Level 0: none events Level 1: sometimes an event Level 2: often an event
Diversity of tenants	Level 0: no diversity of tenants Level 1: moderate diversity of tenants Level 2: strong diversity of tenants
Type of lease contract	Level 0: no leas contract Level 1: short term lease contract (day, week or month) Level 2: long term lease contract (one year or longer)

Mixed-multinomial logit model (MMNL)

To analyse user preferences of co-working space characteristics, an MMNL was used to take the panel structure of the data (multiple observations per respondent) into account (Hensher & Greene, 2001; McFadden & Train, 2000). This method can capture unobserved heterogeneity by estimating a random component for each preference parameter (Train, 2003).

A constant was estimated that represents the utility of the null-alternative 'none of these options'. Also, a random parameter was estimated for each attribute. Since the parameters relating to different levels of a same attribute are conceptually interrelated, a random parameter was estimated for only one parameter related to a same attribute to capture possible heterogeneity related to that attribute. As a somewhat arbitrary choice, the random parameters in the model relate to the significant,

Table 4. Example choice set.

Attribute	Alternative 1	Alternative 2	Alternative 3	None of these options
Accessibility	By car	By car	By public transport	
Atmosphere/ interior aesthetics	Homelike	Industrial	Industrial	
Layout of the space	Open layout	Open layout	Closed layout	
Diversity in supply spaces	Standard	Premium	Standard	
Reception and hospitality	No reception and no host	Reception but no host	Reception but no host	
Events	None	Sometimes	None	
Diversity of tenants	Strong diversity	Moderate diversity	Moderate diversity	
Lease contract	Long term	Short term	No contract	

Table 5. Sample characteristics ($N = 219$).

	N	%	Mean	SD
Gender				
Male	150	68		
Female	69	32		
Age (years)			34.6	11.2
< 24	35	16		
25–34	86	39		
35–44	55	25		
> 45	43	20		
Education level				
Low education (*i.e.* secondary vocational, pre-university and intermediate vocational educations)	32	14		
High education (*i.e.* higher vocational education, university bachelor, master's, doctorate)	187	86		
Position in the organization				
Supporting staff	7	3		
Regular employee	48	22		
Manager	18	8		
Board/owner	92	42		
Does not apply	55	25		
User type				
Self-employed worker, freelancer or entrepreneur	117	54		
Employee of a company (2–10 employees)	38	18		
Employee of a company (11 or more employees)	38	18		
Student	26	12		
Income/year (€)				
> 20,000	59	27		
20.001–50,000	79	36		
> 50,000	31	14		
I don't know/I'd rather not say	50	23		
Hours in co-working space			21.3	14.3
Transport to the co-working space				
By car	112	51		
By bicycle	47	22		
Walking	13	5		
By public transport	47	22		

first level of the attributes. The distribution of the random parameters is defined by a normal distribution. The non-random parameters in the model represent the estimated values for the second level and non-significant first level of the attributes.

The influence of several user characteristics on the user preferences were also analysed, namely: age, gender, education level, user group, position in the organization and number of hours working (on average per week) in the co-working spaces. To analyse the influence of such characteristics, several MMNL models were estimated by including stepwise the interaction variables (*e.g.* age*accessibility by car). The interaction terms were entered into the model as non-random parameters. To estimate the parameters of the model, 1000 Halton draws were used (Bhat, 2001). Halton draws refer to an efficient method of drawing values from a random distribution. Using Halton draws, a lower number of draws is needed to cover the complete distribution compared with just random drawing (Bhat, 2001). This resulted in the final model with only significant interaction variables (Table 6). The estimated MMNL model resulted in a McFadden pseudo-Rho^2 of 0.24. McFadden pseudo-Rho^2 is commonly used to indicate the goodness of fit of the model and a value higher than 0.2 means that the model performs well (Louviere, Hensher, & Swait, 2000).

Sample

Table 5 shows the user characteristics of the sample. Because of a relatively small sample size, the results need to be interpreted with care. As can be seen, the sample consists of a large number of male co-workers. *Deskmag* (2015), an online magazine about co-working worldwide, showed comparable numbers, namely that only 38% of the co-workers was female, so this is representative of the population. The age of the co-workers is on average 34 years, with a standard deviation of 11.2 years. Most respondents are highly educated (86%), which means they have completed at least a higher vocational education. A large percentage of the tenants are self-employed workers, freelancers or entrepreneurs (54%). This is also related to the high percentage of board members/owners and the option 'does not apply'. Most respondents have an annual income of less than €50,000. In addition, co-workers in this sample work on average 21 hours every week in a co-working space; most co-workers travel by car (51%), by bicycle (22%) or by public transport (22%).

Furthermore, respondents were asked about their first, second and third motivations to work at a co-working space. As can be seen in Figure 1, most respondents choose 'I was looking for a workplace outside home' as their first motivation. The motivation 'inspiring and creative atmosphere in the co-working space' was found to be the most important second motivation. Other important motivations were 'affordable accommodation' and 'social interaction with co-workers'.

Results

MMNL model results

Table 6 shows the results with regard to the MMNL model. Of all attributes in the model, one or more levels

were significant. This suggests that all attributes are relevant for choosing a specific co-working space. The most preferred characteristics and attribute levels are highlighted in grey in Table 6. With regard to the random parameters (Table 6), significant standard deviations were found for six attributes, namely: accessibility, atmosphere and interior aesthetics, layout of the space, type of lease contract, diversity of tenants, and reception and hospitality. This indicates indeed that there is some heterogeneity in preferences related to these attributes.

Figure 2 shows the utility impacts of the attributes as an indicator of the importance of attributes in preferences for co-working spaces. These utility impacts are computed using the range between the lowest and highest part-worth utility (the difference between the largest and smallest utility across the levels of the attribute). Part-worth utility indicates the importance of each attribute and level on a co-worker's choices to work at a specific co-working space. As can be seen, the accessibility (by car and/or by public transport) of the location of the co-working space is the most important co-working space characteristic. Next, co-workers attach most importance to the atmosphere and interior aesthetics and layout of the workspace. The least important co-working space characteristics are the reception and hospitality, events, and diversity in supply spaces.

With regard to accessibility, the attribute level accessibility by car and public transport shows the highest part-worth utility. This result suggests that co-workers have a higher preference for co-working spaces that are accessible by both car and public transport. More specifically, older co-workers (≥ 35 years) and managers/board members mainly find accessibility by car important, thus they attach less importance to accessibility by public transport. In the sample, older respondents travel less frequently by public transport (9% of the co-workers aged ≥ 35 years) to the co-working space compared with the younger respondents (30% of the co-workers aged < 35 years), which thus matches their preference.

As for the attribute atmosphere and interior aesthetics, a homelike interior has the highest part-worth utility. The estimates on this level show that co-workers on average prefer a modern interior the least and a homelike interior the most. On the other hand, co-workers with a higher education level have a higher preference for a modern interior. These co-workers might prefer a more professional work environment than co-workers with a lower education level.

With regard to the layout of the co-working space, co-workers have a higher preference for a semi-open layout. This semi-open layout consists of open workspaces in combination with concentration/meeting rooms. It seems that co-workers have a higher preference for work environments that can support all their work activities (*e.g.* concentration rooms for concentrated work and open work spaces for the opportunity to meet other co-workers).

On average, co-workers have a higher preference for no lease contract. This is logical as one of the main motivations to work at a co-working space is the affordable accommodation (Fuzi, 2015; Merkel, 2015). In addition, most respondents in the sample already work at co-working spaces (*i.e.* Seats2Meet, Interpolis Carrousel, Amsterdam Connected, Meet and Discover) that offer office space with no lease contracts (*i.e.* for free). Meeting spaces and facilities are mostly offered based on the pay-as-you-use principle in these offices. Especially, older co-workers (≥ 35 years) and self-employed workers have a higher preference for an office space with no lease contract. On the other hand, co-workers who work more than 20 h in the co-working space do not prefer office space with no lease contract. These co-workers probably have more needs and are therefore more willing to pay for an office space with a higher level of facilities and services. They also probably

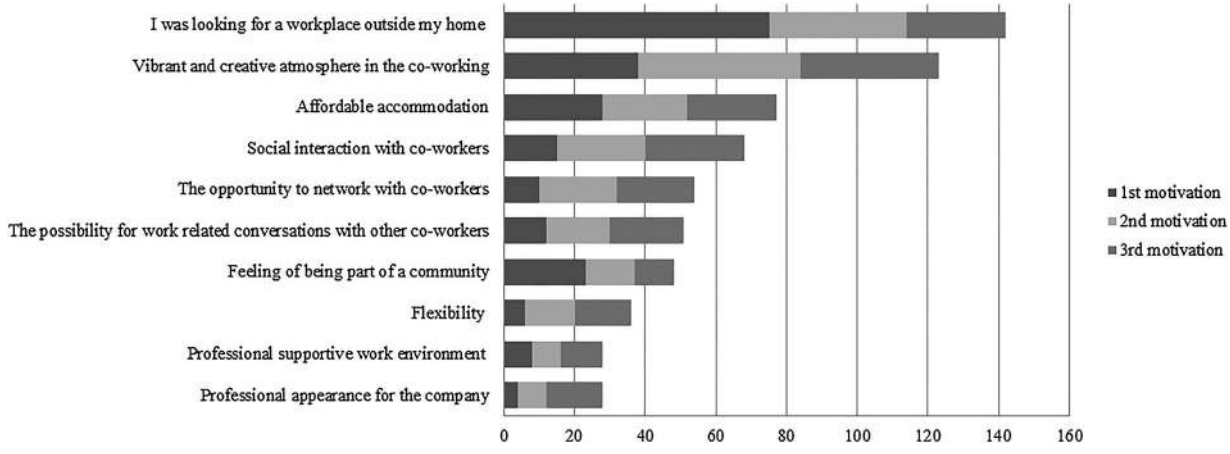

Figure 1. Motivations to work at a co-working space ($N = 219$).

Table 6. Results final mixed-multinomial logit model (MMNL).

Attributes	Attribute level	Coefficient (β)
Random parameters		
Constant	Constant	1.365***
Accessibility	By car and public transport	0.693***
Atmosphere and interior aesthetics	Industrial	−0.163***
Layout of the space	Open layout	0.051
Type of lease contract	No contract	0.362***
Diversity of tenants	No diversity of tenants	−0.331***
Reception and hospitality	No reception and no host	−0.220***
Non-random parameters		
Accessibility	By car	−0.939***
	By public transport (reference)	0.246
Atmosphere and interior	Modern	−0.302**
	Homelike (reference)	0.465
Layout of the space	Semi-open layout	0.328***
	Closed layout (reference)	−0.379
Type of lease contract	Short term contract	−0.048
	Long term (reference)	−0.314
Diversity of tenants	Moderate diversity of tenants	0.168***
	Strong diversity of tenants (reference)	0.163
Reception and hospitality	Reception but no host	0.172***
	Reception and active host (reference)	0.048
Events	None	−0.182***
	Sometimes	0.168***
	Often (reference)	0.014
Diversity in supply spaces	Basic co-working space	−0.061
	Standard co-working space	0.123**
	Premium co-working space (reference)	−0.062
Interaction parameters		
Accessibility	Age (≥ 35 years) * By car and public transport	−0.222**
	Age (≥ 35 years) * By car	0.562***
	Manager * By car	0.193*
Atmosphere and interior	High education level * Modern	0.353***
Type of lease contract	Age (≥ 35 years) * No contract	0.300*
	High education level * Short term contract	0.463***
	Self-employed * No contract	0.352**
	Hours working (≥ 20 hours) * No contract	−0.406**
Distributions of random parameters, standard deviations or limits of triangular		
Constant	Constant	3.266***
Accessibility	By car and public transport	0.328***
Atmosphere and interior	Industrial	0.273***
Layout of the space	Open layout	0.288***
Type of lease contract	No contract	0.859***
Diversity of tenants	Basic co-working space	0.378***
Reception and hospitality	No reception and no host	0.464***

Goodness of fit statistics			
Parameters	32	ρ^2	0.2376
Log-likelihood function (LL(β))	−2083.175	ρ^2 adjusted	0.2335
Restricted log-likelihood function (LL(0))	−2732.386	AIC	4230.4

Notes: AIC = Akaike information criterion.
*Significant at the 0.1 level; **significant at the 0.05 level; ***significant at the 0.01 level.

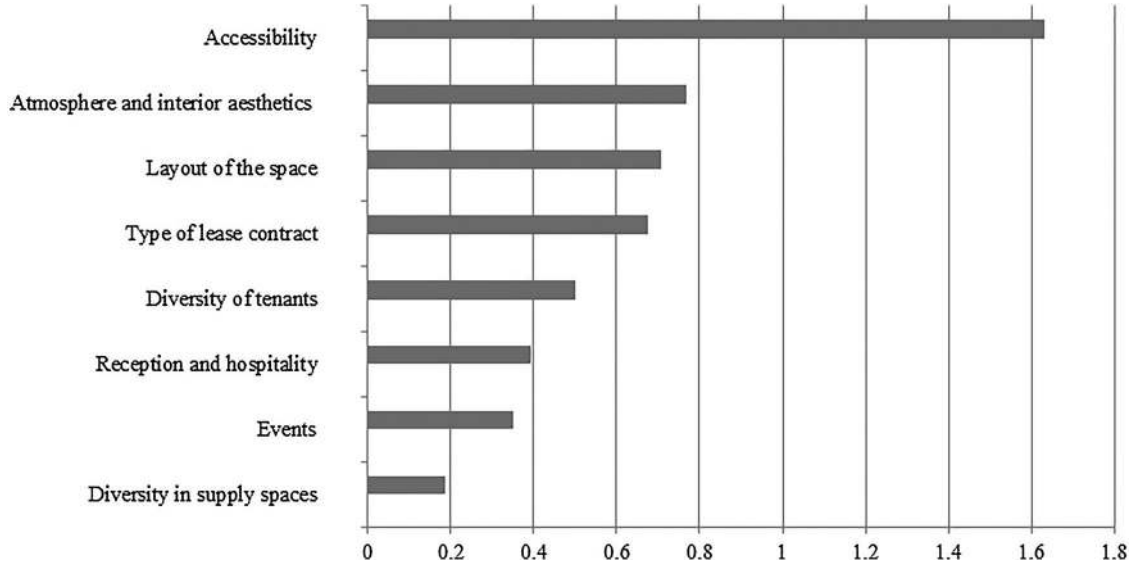

Figure 2. Total utility of attributes.

want more assurance in having an available workspace. People who are highly educated have a higher preference for a short-term lease contract. It is notable that flexibility (*i.e.* a flexible rental period, number of square metres) was one of the least important motivations to work at a co-working space, but the lease contract (*i.e.* short-term or no lease contract) was not the least preferable characteristics for choosing a co-working space (Figure 2).

Furthermore, co-workers have a higher preference for a moderate diversity of tenants (*i.e.* tenants from a few different business fields). With regard to reception and hospitality, co-workers prefer a reception without a host. Co-workers like the fact that an event is organized sometimes, but preferably not too often. With regard to the diversity in supply spaces, co-workers prefer informal areas and event spaces which are part of a standard co-working space.

Discussion

The result that accessibility is the most important characteristic for choosing a co-working space is in line with previous research. For example, Capdevila (2013) stated that location is the most important characteristic of a co-working space. Co-workers more often choose a co-working space that is in close proximity to their home and a more central and accessible location could stimulate a local professional community (Capdevila, 2013). Remøy and Van der Voordt (2014) also showed that for the creative industry, which is also the field of a large number of tenants in the sample, the accessibility of the location by public transport, by bicycle and by car is highly important.

Furthermore, the results showed that facilities/services such as a reception and hospitality, events, and diversity in supply spaces are the least important for co-workers. This is an interesting finding because these facilities and services could bring co-workers together and create a higher sense of community (Bilandzic & Foth, 2013), which distinguishes co-working spaces from other multi-tenant offices (Weijs-Perrée et al., 2016). An explanation might be that not many users in the sample chose being part of a community for their top three motivations to work at a co-working space. In addition, co-workers do not prefer a co-working host. This is remarkable, as a co-working host is meant to support tenants, create a good atmosphere and stimulate interaction among co-workers (Fuzi, 2015). This result is likely because respondents in this sample work at co-working spaces without co-working hosts, which could influence their choice. Also, these respondents probably do not see the added value of a host and find only a simple reception satisfactory.

This study also showed that co-workers prefer a work environment with a combination of open and closed workspaces for different types of work activities. It has been recognized by previous studies in single-tenant offices that fully open-plan work environments could lead to noise, privacy and concentrations problems (Kim & de Dear, 2013), and it appears that the same holds true for co-working offices. Co-workers in this study prefer a standard co-working space with informal meeting and event spaces. They prefer these spaces probably because one of their motivations to work at a co-working space is the opportunity for interaction with other co-workers (*e.g.* Kojo & Nenonen, 2014; Sykes, 2014). On the other hand, the results showed that the diversity of spaces was the least important characteristic for co-working spaces. Especially, a fitness centre and bar (*i.e.* in a premium co-working space) are not considered

important by co-workers. This might be related to the fact that the co-workers in this sample prefer a low-cost co-working space and one without additional services/facilities (Fuzi, 2015; Merkel, 2015). An increased number of self-employed people are looking for an affordable workspace outside their home (Moriset, 2013) and might have fewer resources to rent an office space. Therefore, they could prefer a co-working space without a lease contract.

Previous studies described a co-working space as a community-driven environment where like-minded individuals of different business fields can meet each other (*e.g.* Capdevila, 2013; Merkel, 2015). This study also showed that co-workers prefer a diverse group of tenants (*e.g.* different business field), but not too much diversity.

Limitations

This study also has some limitations. First, the characteristics of the current co-working spaces where respondents mostly work were not asked in the questionnaire. Only some information about the 16 visited co-working spaces was available. Thus, the relation between their current situation and their preferences could not be analysed. The current situation of respondents may possibly influence the choice of the hypothetical co-working space and needs to be included as a control variable in future studies. Also, the preferences for typical co-working space facilities or services (*e.g.* coffee corner, event space, lounge space, fitness centre or bar) were not analysed in detail. These were combined in the attribute 'diversity of supply spaces'. Future research could include these characteristics or use other methods to obtain more insight into a co-worker's specific needs and preferences. This could help owners and managers of co-working spaces to adapt to the needs and maximize the user satisfaction and eventually the use of the co-working space. In addition, supplementing the quantitative data of this research with qualitative data (*e.g.* focus groups or interviews) would be interesting to interpret the results in a better way and to explore the preferences of users and experiences of co-working space owners and managers in more detail.

By using the stated-choice experiment method, hypothetical choices were measured. Future studies could use other methods (revealed preference method) to analyse real-world situations. Being one of the first on a relatively new concept, the study inevitably also has limitations regarding the attributes of co-working spaces and co-workers that were considered. Other attributes (*e.g.* concentration rooms, 24-h access, printing facilities, internet access, coffee quality, price/quality ratio and virtual platform) and attribute levels can be added to analyse additional aspects of co-working spaces. In addition, other attributes could become more important in future or in a different setting. For example, only the physical accessibility was taken into account in this study, but the digital accessibility could also be an important aspect of a co-working space as a place for mobile workers. The distance between a co-worker's home and the co-working space could also be an important accessibility factor. Including other user characteristics (*e.g.* personality and work activities) could give further insight into personal differences with regard to user preferences. It would also be interesting to analyse the influence of several characteristics of different co-working spaces on user satisfaction. This could help to provide guidelines for future co-working spaces. Moreover, a larger data set with data on co-working spaces in different countries could increase the generalizability of the results. Future research also needs to analyse differences with regard to user preferences between different types of multi-tenant offices in more detail. As they seem to be the new norm for an increasing number of organizations, they deserve a lot more attention from academics.

Conclusions and recommendations

This study offered new insights into the preferences for co-working space characteristics that co-workers display when choosing where to work, which were missing in previous research. Quantitative research on co-working space characteristics has been limited in the past. Through the use of a stated-choice method, it was possible to discover preferences for all forms of co-working spaces. This method is innovative in the workplace preferences and satisfaction research field and shows potential for further analysing a user's needs and preferences. Regular satisfaction surveys do not force users to choose, thus they provide rankings with small differences between the highest and lowest scores. A stated-choice method overcomes these limitations and offers the ability to use hypothetical co-working spaces. This offers new insights into user preferences of co-working spaces, which can be used when designing or developing a co-working space. The results of this study can thus help build new theories on the use and preferences of an increasingly popular multi-tenant office worldwide.

The results showed that the motivation of most co-workers in this sample relates to the fact they are looking for a workplace outside their home, such as the inspiring and dynamic atmosphere in co-working spaces, seek affordable accommodation and like the opportunity for social interactions with other co-workers. These results can help owners and managers of co-working spaces make more well-informed decisions about their co-working space and to focus on offering the most

important aspects for co-workers at a reasonable price. For example, by offering enough parking spaces, they satisfy managers of an organization who prefer accessibility by car. It is important to satisfy managers as they make their location choice decisions. To attract and retain co-workers, owners and managers of co-working spaces should create an inspiring and creative atmosphere with a homelike interior and a semi-open layout with workstations for different work activities. Furthermore, it is important to offer affordable office space with a short-term or no lease contract because this is one of the main motivations for co-workers to choose to work at a co-working space. Next, the results showed that co-workers in this data set prefer a moderate diversity of tenants, so that tenants can share their knowledge about different expertise and complement each other. This should be taken into account by owners and managers of co-working spaces when they select tenants. However, the level of tenant diversity also depends on the context and business situation of tenants. Using a larger data set in future research could improve the generalization of 'the best' tenant diversity level for several situations.

Although, the diversity of spaces was found to be the least important attribute, it is important for owners to offer a wide range of workspaces (*i.e.* a standard co-working space), such as meeting spaces, an open work environment, kitchen areas, event spaces, informal zones and concentration rooms, to adapt to the needs and activities of the increasingly diverse group of tenants they are attracting. Owing to the flexible and short-term lease contracts of co-working offices, tenants frequently change and thus perhaps also their user characteristics and preferences. Therefore, it is important to monitor frequently the needs and preferences of tenants of a specific co-working space and be able to adapt it to these preferences through flexible workspaces and adaptable furniture.

It is recognized by previous studies that a co-working host is essential for creating a community by stimulating collaboration among co-workers (Fuzi, 2015). However, this study showed that respondents prefer a co-working space without a co-working host. This is probably because feeling part of a community is not one of their main motivations to work at a co-working space. Further research should look whether the motivations of co-workers have changed now that it has become more mainstream, or that it is a specific outcome for this sample. In any case, motivations are an important aspect for owners to obtain regularly updated information about. Although the results showed that feeling part of a community might not be one of the main motivations to work at a co-working space, it is the main focus of most co-working spaces compared with other types of offices (*e.g.* Garrett et al., 2017; Moriset, 2013). Keeping close contact with their users will show owners and managers of co-working spaces whether this focus is future proof. Social interaction with other co-workers such as a casual small talk, enjoying each other's company and helping each other remain very important aspects for co-workers when working in a co-working space (Corenet Global, 2016). It is recognized that having close contacts at work increases employee satisfaction (Roth & Mirchandani, 2016). Besides the social aspect, sharing resources, skills, creativity, expertise and knowledge with each other is an important aspect of co-working (Schöpfel et al., 2015). Therefore, it is interesting for future research to analyse which (other) preferred aspect of co-working spaces actually stimulates the interaction between co-workers, eventually creating a community.

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