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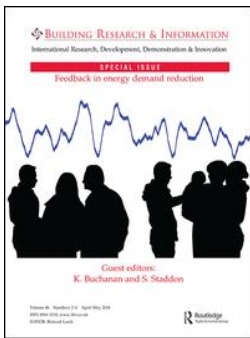
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The influence of personality on user satisfaction: multi-tenant offices

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ABSTRACT

Many different multi-tenant offices have arisen over the last decades, as building owners address the changing nature of the workplace – a need for users to share facilities. However, the existing literature on multi-tenant buildings from the point of view of user satisfaction is scarce, limiting input for user-centred design. This study analyses the influence of personality on user satisfaction with multi-tenant office characteristics. Data were collected through a questionnaire distributed among users of 17 different multi-tenant offices (business centres, incubators serviced offices and co-working places), which yielded 190 respondents. To determine the effects of personal characteristics, a multiple regression model was performed per office variable category. Results showed that users who are more extraverted, open to new experiences and more agreeable were overall more satisfied with the multi-tenant office characteristics. However, the effects of demographics and work-related characteristics were much larger. Men, older users and users working in an open and flexible work environment were overall more satisfied with the office characteristics. Owners, developers and managers can use these results for developing user-centred designs, optimizing the level of satisfaction in their offices.

KEYWORDS

co-working; demographics; multi-tenant offices; occupants; offices; open plan; personality; user satisfaction; workplace

Introduction

In general, it is essential that the work environment has a positive effect on individual behaviour, as people spend a substantial part of their lifetime in a work environment (Earle, 2003). Since the 1960s, the relationship between individual behaviour and the work environment has been recognized and received increased attention (Craik, 1966; Moore, 1980; Sailer, Pomeroy, & Haslem, 2015). For instance, researchers have recognized that the physical work environment influences people's behaviour and organizational processes (e.g. Kampschroer & Heerwagen, 2005), such as productivity (Gensler, 2005), job performance (Vischer, 2008), job satisfaction (Koster, 2009; Newsham et al., 2009), creativity (McCoy, 2005) and stress levels (McCoy & Evans, 2005).

For the development of better physical work environments, knowledge about user satisfaction is crucial (Lindahl, Hansen, & Alexander, 2012). User satisfaction refers to the level that the office and work environment meet the wishes and needs of the user (Schmitt, 1999; Van der Voordt, 2004) and has been studied extensively.

Prior research has focused on user satisfaction with characteristics of single-tenant offices, such as the indoor climate, layout, atmosphere and facilities (e.g. Mawson, 2002; Thompson & Jonas, 2008; Vischer, 2008). These studies largely ignored multi-tenant offices where organizations share spaces, facilities and services. 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).

The popularity of shared multi-tenant offices has increased over the past decades due to the decreasing need of space, the increasing number of self-employed workers (Ketting, 2014), the increasing need for flexibility (Gibson & Lizieri, 1999), user comfort and a high level of services (e.g. Barber, Laing, & Simeone, 2005). In addition, due to high vacancy rates of single-tenant offices, the number of transformations of single- into multi-tenant offices has increased (Lokhorst, Remøy, & Koppels, 2013).

Many organizations, especially small and medium-sized enterprises (SMEs) and self-employed people,

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have clustered together in multi-tenant offices because of the benefits of sharing facilities and services, creating cost savings, improving the balance between work and private life, network opportunities and sharing knowledge (e.g. De Vries, Van der Voordt, & Arkestijn, 2004; Fuzi, Clifton, & Loudon, 2014). However, it is still not clear if these users have the same preferences and satisfaction levels as tenants (mostly larger organizations) of single-tenant offices. Therefore, more in-depth research would help owners/managers of multi-tenant offices to obtain an insight into the preferences of users and to adapt their multi-tenant offices to the needs of different types of users.

It is recognized that personal aspects (e.g. age, gender, job status and role in organization) are important indicators for user satisfaction in single-tenant offices (e.g. Volker & Van der Voordt, 2005). In addition, only a few studies showed that personality is an important indicator for user satisfaction with characteristics of single-tenant offices (Hills & Levy, 2014; Oseland, 2009). Personality can be described as 'patterns of emotion, thought and behaviour that represent stable and lasting differences between individuals' (Perkins, 2016, p. 7). Thus, people with different personalities probably have different needs and preferences. For example, those who are more open to new experiences prefer to meet in non-traditional spaces (e.g. bar or lounge room) (Oseland, 2009). Therefore, it is important for owners/managers of multi-tenant offices to obtain an insight into these differences to create work environments that reflect the personalities of all users or specific user groups.

Research into the relationship between personal characteristics and the physical work environment in multi-tenant offices is still limited. Therefore, analysing the influence of personality, demographics and work-related characteristics on user satisfaction with multi-tenant offices is needed to contribute to academic research on the relation between individual differences and user's satisfaction.

The purpose of this study is, therefore, to analyse the relationships between personal characteristics (*i.e.* personality, demographics and work-related characteristics) and user satisfaction with the physical characteristics of shared multi-tenant offices.

Data were collected by using a questionnaire that was completed by 190 respondents of 17 different Dutch multi-tenant offices. Relationships were tested using multiple regression analyses (MRAs) and some exploratory analyses.

The paper is structured as follows. The next section reviews the existing literature on multi-tenant offices, user satisfaction, personality and demographic

characteristics. The third section describes the methods and data collection, followed by the analyses and results in the fourth section. The final section contains the conclusion and discussion.

Multi-tenant offices

The early multi-tenant offices were an Anglo-Saxon invention to accommodate small companies and to strengthen the local economic structure (Van den Berg & Stijnenbosch, 2009). Multi-tenant offices provided shared office space, shared services and facilities to support companies, which could lead to several benefits for organizations, such as sharing knowledge and creating cost savings (Fuzi et al., 2014; Ketting, 2014). In general, aspects such as accessibility of the location, flexible (shared) workspace, shared facilities and services, support and advice, access to tools, resources and network and meeting rooms are valued aspects for users of multi-tenant offices (e.g. Barrow, 2001; Price & Spicer, 2002). Prior research showed that multi-tenant offices can be divided into four different multi-tenant office concepts: regular business centres, incubators, serviced offices and co-working places (Weijs-Perrée et al., 2016a).

First, regular business centres are offices with different sized rooms, flexible lease contracts and a relatively low level of shared facilities and services (e.g. Calder & Courtney, 1992; Weijs-Perrée et al., 2016a). Incubators accommodate start-ups and entrepreneurs. These offices offer flexible space, shared equipment and focus on advice, training and business counselling (e.g. Grimaldi & Grandi, 2005). Serviced offices offer a high level of service in order to stimulate tenants to focus on their core business. They accommodate self-employed people as well as SMEs. Last, co-working offices are creative and energetic spots with flexible workspaces that are mostly used by freelancers and entrepreneurs. Co-working offices focus on knowledge sharing, low capital investment, flexibility and being a community (e.g. Fuzi et al., 2014).

User satisfaction with the physical work environment

Many studies on the physical work environment looked at user satisfaction (e.g. Bodin Danielsson & Bodin, 2008; Brown & Cole, 2009; De Been & Beijer, 2014; Maarleveld, Volker, & Van der Voordt, 2009). Another study by Remøy and Van der Voordt (2014) analysed user preferences of the creative industry, which is a large part of the users of multi-tenant offices. Results showed that the creative industry prefers accessibility by bicycle and public transport, a flexible layout, common areas with other

tenants and good information and communication technology (ICT) facilities.

However, the personality of (multi-tenant) office users remains underexposed in relation to user satisfaction. There are a few empirical studies that report the relationship between personality and user satisfaction (Hills & Levy, 2014; Oseland, 2009) in single-tenant offices. For instance, a recent study showed that employees were more satisfied with the physical work environment if they can express their emotions and personality (Hills & Levy, 2014). Another study showed a relation between personality and colour preferences for meeting rooms in offices (Bakker, Van der Voordt, Vink, de Boon, & Bazley, 2015).

Other studies recognized the relationships between personality and workspace satisfaction (Matzler, Renzl, Müller, Herting, & Mooradian, 2008), job satisfaction (Judge, Bono, & Locke, 2000), work involvement (Bozionalos, 2004) and personalization of the workspace (Wells & Thelen, 2002). These studies used the personality traits of the 'big five' (*i.e.* extraversion, agreeableness, conscientiousness, emotional stability and openness to experience) to take personal aspects of people into account.

It is also recognized that several demographic characteristics could influence user satisfaction. For example, women are generally less satisfied with the indoor climate compared with men because women are more critical about the indoor climate (De Been & Beijer, 2014). Another study showed that for women it is of importance to have an impact on the work environment (*i.e.* adjustability of indoor climate, possibility to adjust office furniture) (Rothe, Beijer, & Van der Voordt, 2011). It also showed that for younger people it is more important to work in an environment that supports collaboration, have restaurant services near the workplace and that the office is accessible by bicycle. For older people it is more important that they can adjust the indoor climate.

Besides demographics, work-related characteristics might also influence user satisfaction, such as job status, line of business, profession and years with the organization, job rank, role and employment type (*e.g.* Bodin Danielsson & Bodin, 2008; Furnham, Eracleous, & Chamorro-Premuzic, 2009; Van der Voordt, 2004). Thus, many studies that focus on user satisfaction with office characteristics found a possible influence of demographics and work-related characteristics (De Been & Beijer, 2014; Van der Voordt, 2004; Van Susante, 2014). Therefore, besides personality, it is necessary to analyse the relation between demographics, work-related characteristics and user satisfaction with physical characteristics as well.

Previous studies on the relationships between user satisfaction and the work environment in single-tenant offices (*e.g.* Frontczak et al., 2012; Rothe et al., 2011) also provided extensive lists of different physical characteristics that influence the satisfaction of users (Bodin Danielsson & Bodin, 2008; Rothe et al., 2011; Van Susante, 2014). Relevant work environment characteristics that could influence user satisfaction can be summarized into 10 categories (Table 1).

Methods

This study is quantitative research with an exploratory character. Data of personal characteristics of users and the user satisfaction were collected using a specifically designed questionnaire (online and paper based) as existing questionnaires on user satisfaction were not designed to address multi-tenant office-specific characteristics. A questionnaire is a reliable, objective method to collect information about people's knowledge, behaviour and opinion (Sapsford, 1999).

Participants

The online questionnaire was distributed between June and July 2015. To reach users of multi-tenant offices, building managers and building providers of 30 different multi-tenant offices were asked (by email or phone) whether the questionnaire could be distributed among users of their multi-tenant offices. Subsequently, a reminder was sent a week later. As there was a low degree of participation of the building managers of these multi-tenant offices, it was decided to visit several of the multi-tenant offices and personally approach users to fill in the questionnaire on paper. This approach was more successful and generated almost half the respondents. In total, 750 multi-tenant office users received the questionnaire. Of the distributed questionnaires, 224 users of 17 different multi-tenant offices filled it in. Thus, the overall response rate is (at best) 30%. Unfortunately, 34 questionnaires were incomplete or unreliable and therefore they were removed from the dataset. Overall, this led to a total of 190 useful questionnaires (100 online questionnaires and 90 paper questionnaires).

The multi-tenant offices were randomly selected and distributed across the Netherlands, from big cities to local offices in small villages. Characteristics of the multi-tenant offices are shown in Table 2. The 17 participating multi-tenant offices differed in location (from A to C locations), size (from 20,000 to 500 m²), type of multi-tenant offices (eight regular business centres, two incubators, one serviced office and six co-working spaces), appearance (from old renovated industrial

Table 1. Overview literature on physical characteristics of offices and user satisfaction.

	Batenburg and Van der Voordt (2008)	Barrow (2001)	Brill and Weidemann (2001)	Bodin Danielsson and Bodin (2008)	De Been and Beijer (2014)	Hills and Levy (2014)	Kim and de Dear (2013)	Lee (2006)	Liebrechts (2013), Van Susante (2014)	Maarleveld et al. (2009)	Mawson (2002)	Riratanaphong and Van der Voordt (2011)	Rothe et al. (2011)	Schwede, Davies, and Purdey (2008)	Thompson and Jonas (2008)	Vischer (2008)	Van der Voordt (2004)	Zimring, Dogan, Dunne, Fuller, and Kampschroer (2005)
Location	×					×				×		×	×				×	×
Office exterior and division	×			×	×	×						×	×	×				×
Office decor	×		×	×	×		×	×	×	×	×	×	×	×				×
Facilities and services	×	×				×			×									×
Seclusion rooms	×		×				×		×					×				
Office leisure	×		×				×		×									
Flexibility	×		×	×			×	×	×	×	×			×	×	×	×	×
Information and communication technology and equipment	×		×		×				×	×		×					×	×
Privacy	×				×		×	×	×	×	×				×	×		×
Office climate	×		×		×		×		×	×	×	×				×		×

Table 2. Characteristics of studied multi-tenant offices.

	Type	Location	Development type	Respondents	Tenants	Size (m ²)
1	Co-working office	A	Redeveloped industrial building/factory	3	70	12,000
2	Regular business centre	B	Redeveloped office	3	10	–
3	Regular business centre	C	Redeveloped old school building	26	60	4800
4	Regular business centre	C	Redeveloped old school building	16	70	6500
5	Co-working office	A	Redeveloped industrial building/factory	3	70	2500
6	Regular business centre	B	Redeveloped office	4	15	–
7	Regular business centre	B	Redeveloped industrial building/factory	12	90	20,000
8	Incubator	C	Redeveloped office	7	20	500
9	Serviced office	A	Redeveloped office	13	20	3400
10	Co-working office	B	New built office	4	40	30,000
11	Incubator	A	Redeveloped office	4	10	1500
12	Regular business centre	A	Redeveloped industrial building/factory	2	40	60,000
13	Regular business centre	B	Redeveloped industrial building/factory	12	120	4500
14	Co-working office	B	Redeveloped industrial building/factory	29	70	2500
15	Co-working office	B	Redeveloped office	32	70	3000
16	Regular business centre	B	Redeveloped office	6	50	–
17	Co-working office	A	Redeveloped office	14	40	3500
Total respondents				190		

Notes: The three different locations can be categorized as follows: A = office location in the city centre near the main train station (good accessible by public transport); B = office location situated near a suburban train station or an intersection of high-quality public transport (metro, light rail) and has a fast connection to the main highway network; and C = office location in the outskirts of the city with a direct connection to the main highway network (less accessible by public transport).

factories to new designed office buildings) and number of tenants (from 130 to 10 tenants).

The 190 participants were aged between 17 and 68 years old (mean = 34, SD = 10.73). This wide range can be explained by the fact that multi-tenant offices have very different users, like students, freelancers and employees from SMEs or large organizations. From these users, 128 were male (67%) and 62 female (33%). The respondents were well educated (88% with a minimal level of undergraduate), mostly working as a freelancer (56%) and in the business- (29%) or technical-oriented sector (46%). More than half the respondents were a board member of their organization (55%). Besides that, 32% of the respondents had an income of less than €20,000/year. Both results can be explained by the fact that a large part of the respondents work as a freelancer.

Measures

To measure personality, the ‘big five’ taxonomy was used. This taxonomy is the most validated method to define personality traits of users. It is widely accepted and commonly used by researchers (e.g. Bhatti, Kaur, & Battour, 2013; Judge et al., 2000). The big five consists of the following domains: extraversion, agreeableness, conscientiousness, emotional stability and openness to experience. The Ten Item Personality Inventory (TIPI)

was used to measure the big five personality traits. Respondents were asked about their agreement with 10 statements on a seven-point Likert scale, ranging from strongly disagree (1) to strongly agree (7) (Goslin, Rentfrow, & Swann, 2003). The 10 statements were five pairs of two reverse scores of the five domains.

Respondents were also asked about demographic characteristics, namely their age, gender, education level, income and mobility by using open and multiple-choice questions (Table 3). Furthermore, respondents were asked about work-related questions. First, they were asked about the sector of current organization, number of years working at the current organization, current position and number of working hours per week. Next, they were asked about the type of work environment (open or closed work environment) and the type of workspace (fixed or flexible workspace).

Previous studies measured user satisfaction of characteristics of single-tenant offices in several different ways. For example, Leesman Office, a private company that collects data about employee satisfaction with office environments, asked respondents whether they consider a specific feature or facility of the office environment as an important part of an effective workplace. Next, if respondents consider it as important, they were subsequently asked to rate their satisfaction with this feature or facility in their current workplace on a seven-point scale, ranging from –3 to 3 (Van Susante, 2014). In addition, to get

Table 3. Operationalization of the demographic and work-related characteristics.

Variables	Type of item
Demographics	
Gender	Multiple choice (2): male, female
Age	Open question
Education level	Multiple choice (5): primary, secondary, vocational, undergraduate, postgraduate
Income	Multiple choice (5): ≤ €20,000/year, €20,001–30,000/year, €30,001–40,000/year, €40,001–50,000/year, > €50,000/year
Mobility (the frequency with which they use a car, public transport, motorbike, bike and walking)	Multiple choice (5): never, < 1 time/week, 1–2 times/week, 3–4 times/week, always
Work-related characteristics	
Job status	Multiple choice (5): regular employment, temporary employment or on project basis, freelancer, student
Sector of current organization	Multiple choice (5): help/support sector, personal services sector, business-oriented sector, technical-oriented sector, other sector
Number of years working at the current organization	Open question
Current position	Multiple choice (4): regular worker, support staff, manager, board member
Number of working hours/week	Multiple choice (5): ≤ 16 hours/week, 17–24 hours/week, 25–32 hours/week, 33–40 hours/week, ≥ 41 hours/week
Work environment	Multiple choice (2): open work environment, closed work environment
Workspace type	Multiple choice (2): fixed workspace, flexible workspace

more insight into underlying reasons why people are satisfied or unsatisfied with particular characteristics, open or semi-structured interviews can be conducted (De Been, Beijer, & Den Hollander, 2015). Satisfaction can also be measured by simply asking respondents how satisfied or dissatisfied they are with certain characteristics (Brunia, Van der Voordt, & Appel-Meulenbroek, 2016). Similar to such questionnaires in previous studies (Maarleveld et al., 2009), respondents were asked ‘How satisfied are you with ...’, on a five-point scale, ranging from 1 (very dissatisfied) to 5 (very satisfied) with 37 different physical characteristics of multi-tenant offices (Table 4).

Procedure

The personality traits were identified as interval variables in the analyses. The Cronbach’s alpha of the five pairs, namely extraversion ($\alpha = 0.478$), agreeableness ($\alpha = -0.265$), conscientiousness ($\alpha = 0.422$), emotional stability ($\alpha = 0.362$) and openness to experience ($\alpha = 0.484$), were lower than $\alpha = 0.6$, which indicated that the homogeneity was not so high. In a previous study, the same method was used and the personality traits also had lower Cronbach’s alphas (Goslin et al., 2003). This is probably the result of the low number of items (*i.e.* two items) in each pair. Therefore, the inter-item correlation was also measured. The inter-item correlation of extraversion = 0.314, agreeableness = -0.122, conscientiousness = 0.303, emotional stability = 0.224 and openness to experience = 0.323. The optimal inter-item correlation ranges from 0.2

to 0.4 (Pallant, 2010). Thus, besides agreeableness, all pairs have a high homogeneity and, therefore, the personality traits, extraversion, conscientiousness, emotional stability and openness to experience were used in further analyses. As the inter-item correlation and Cronbach’s alpha of the personality trait agreeableness are negative, it was decided to only use the positive statement of agreeableness in this study.

Table 4 shows the results of the reliability analysis of the 10 categories of user satisfaction characteristics. It is suggested that a Cronbach’s alpha of 0.7 (and sometimes 0.6) is acceptable (Loewenthal, 1996). As can be seen, the physical characteristics (items) that were included in the 10 categories were not homogeneous enough to use only 10 categories in the further analyses. The Cronbach’s alpha of the category location was 0.510, which means that the homogeneity of the sum score of the two used items is low. Therefore, the items ‘accessibility by car’ and ‘accessibility by public transport’ were used as separate variables in the main analyses. The category ‘office leisure’ had a Cronbach’s alpha of 0.412, which is even lower. Therefore, these three items were also used as separate variables in the analyses. This resulted in a total of 13 user satisfaction variables.

Next, 14 MRAs were performed to explore the relationship between the 14 dependent variables ‘user satisfaction with physical characteristics’ (including the total user satisfaction as a dependent variable) and the independent variables personality traits, demographics and work-related characteristics. Two different models

Table 4. Cronbach's alpha user satisfaction with physical characteristics.

Category	Items	Cronbach's alpha (α)
Location	2	0.510
Accessibility by car		
Accessibility by public transport		
Office exterior and division	3	0.807
Architecture and appearance of the building		
Office type		
Subdivision of the building		
Office decor	3	0.773
Furnishing of the office (e.g. materials, colours, plants)		
Openness and transparency of the office		
Diversity of workspaces in the office		
Facilities and services	15	0.874
Access inside (number/position of lift/stairways)		
Post/mail delivery		
Security		
Internal signage		
Reception and helpdesk		
Networking events, trainings and workshops		
Booking system		
Car parking		
Bike parking		
Cleaning		
Office opening hours		
Support services		
Secretarial services		
Business services		
Americans with Disabilities Act (ADA) compliance		
Seclusion rooms	3	0.703
Meeting rooms		
Concentration rooms		
Social spaces		
Office leisure	3	0.412
Canteen/restaurant and coffee/tea vending machines		
Entrée and atrium areas		
Washroom facilities/showers		
Flexibility	4	0.633
Number of flexible workspaces		
Number of fixed workspaces		
Adaptability of furniture		
Personal control of indoor climate		
Information and communication technology (ICT) and equipment	1	–
Privacy	2	0.680
Acoustics (noise level, noise control, sound)		
Space between work setting		
Office climate	1	–
Total user satisfaction	37	0.932

were tested to analyse the influence of personality on user satisfaction. The first model analysed the single effects of personality traits on user satisfaction with physical characteristics of multi-tenant offices. In the second model demographics and work-related characteristics were also added. However, not all demographic characteristics could be included in the models because assumptions of the MRA stated that it is not allowed to enter all the demographic variables into the MRAs when the number of cases is small (Pallant, 2010). Therefore, first significant relations were determined using bivariate analyses. Only the demographics and work-related characteristics with significant bivariate relations with the user satisfaction variables were entered into the models (Tables 7–9).

To analyse the effects of personality and demographic characteristics on user satisfaction with facilities and services, canteen/restaurant/coffee/tea and privacy, MRA could not be used because these dependent variables were not normally distributed. Therefore, the effect of personality on these dependent variables was explored using Spearman rank-order correlation (ρ) (Table 10).

Results

The personality of the respondents in the dataset can be described on average as extraverted and enthusiastic (Table 5). Moreover, most respondents stated that they are dependable, self-disciplined, sympathetic, calm, emotionally stable, open and curious to new experiences. As can be seen, there is a low variation in personality differences. Respondents score high on all personality traits. Table 5 also shows that satisfaction was the highest with accessibility and the availability of fixed workspaces. The personal control of indoor climate received the lowest satisfaction. Total satisfaction was fairly high, as it scored 3.54 on a scale of 5.

The results of the MRAs (Table 6) indicated that user satisfaction with several physical characteristics depends on personality, demographics and work-related characteristics. The first model has an adjusted R^2 of 0.027 for explaining total user satisfaction. This means that only 2.7% of the total variance can be explained by personality in the model. Thus, although this was not expected, differences between personalities do not appear to have a high impact on user satisfaction in these buildings. The second model, in which demographics were added, has an explained variance of 15%. So the addition of the control variables increased the explained variance by approximately 12%. This shows that demographics and work-related characteristics play a more important role in explaining user satisfaction with physical characteristics of shared multi-tenant

Table 5. Descriptive statistics.

	<i>N</i>	<i>Mean</i>	<i>SD</i>
Personality traits (strongly disagree (1) to strongly agree (7))			
Extraversion	190	4.285	1.159
Agreeableness	190	5.660	0.922
Conscientiousness	190	5.380	1.018
Emotional stability	190	5.495	0.887
Openness to experience	190	5.640	0.959
User satisfaction with ... (very dissatisfied (1) to very satisfied (5))			
Accessibility by public transport	176	3.98	0.965
Fixed workspaces	160	3.87	0.584
Accessibility by car	178	3.81	0.971
Office exterior and division	190	3.73	0.718
Office decor	185	3.72	0.729
Flexible workspaces	160	3.63	0.733
Seclusion rooms	145	3.62	0.692
Canteen/restaurant/coffee/tea	176	3.61	1.041
Entrée and atrium areas	179	3.59	0.898
ICT and equipment	157	3.59	0.825
Adaptability furniture	146	3.58	0.845
Privacy	161	3.48	0.786
Facilities and services	99	3.39	0.521
Washroom facilities	188	3.23	0.984
Office climate	186	3.12	1.064
Personal control indoor climate	176	2.98	1.017
Total user satisfaction with physical characteristics	190	3.54	0.461

offices than personality. However, these low variances of the two models show that probably other characteristics are important for explaining user satisfaction with physical characteristics of multi-tenant offices too.

Personality

Table 7 shows that the personality trait extraversion was found to have a negative effect on user satisfaction with office exterior and division, seclusion rooms, washroom facilities and personal control of indoor climate. Positive relationships were found with user satisfaction with accessibility by car and privacy. As introverted people have a desire to remain in solitude (Ashton, Lee, Paunonen, 2002) they may be more critical about the privacy, office layout, social meeting rooms and indoor climate in multi-tenant offices than extroverts.

Agreeableness was found to influence user satisfaction positively with six physical characteristics, namely office exterior and division, seclusion rooms, flexible workspaces, fixed workspaces, adaptability of furniture and

facilities/services. Also, a significant effect was found between agreeableness and total user satisfaction. Agreeable users are sympathetic and enthusiastic to help others, and they seek cooperation rather than competition (Liao & Chuang, 2004). Perhaps, therefore, agreeable people were more satisfied with the physical work environment.

The personality trait conscientiousness did not significantly influence user satisfaction with any physical characteristic or the total user satisfaction. Conscientious users are described as careful, thorough, dependable, responsible and self-disciplined users (Borkenau & Ostendorf, 2008). Prior research stated that conscientiousness influences job satisfaction (Furnham et al., 2009) and is related to personalization of the workspace (Wells & Thelen, 2002). Specifically job satisfaction is related to satisfaction with the physical work environment (Veitch, Charles, Newsham, Marquardt, & Geerts, 2003). Accordingly, it is remarkable that there are no defined relations reported between conscientiousness and user satisfaction with physical characteristics. Future research into this specific relation is interesting.

Only one significant positive relationship was found with regard to the personality trait 'emotional stability', namely satisfaction with the 'accessibility by public transport'. Emotional stable users are identified as calm, relaxed, secure users who are rarely anxious, depressed or angry (Wolff & Kim, 2012). Emotional stability is also related to the ability to handle stress (Bhatti et al., 2013) and it makes people confident and positive (Hogan & Holland, 2003).

Users who are more open to new experiences were found to be more satisfied with the office exterior and division, office decor, washroom facilities and canteen/restaurant/coffee/tea. People who are more open to experience might be more satisfied with the physical characteristics because they are curious and sensitive to their environment (Matzler et al., 2008). A notable negative relationship was found with user satisfaction with the adaptability of furniture. This might be caused by the non-adaptability of furniture in the selected multi-tenant offices in general.

Demographics

The results in Table 8 show that several demographic characteristics were found to have a significant effect on user satisfaction with physical characteristics in multi-tenant offices. For example, women were significantly less satisfied with accessibility by car, office exterior and division, washroom facilities, personal control of indoor climate, office climate and privacy. In addition, a significant effect was found on total user

Table 6. Specification of the 14 multiple regression analyses (MRAs).

User satisfaction with ...	Model I (five personality traits as independent variables)			Model II (five personality traits and demographic characteristics as independent variables)		
	Adjusted R^2	F	N	Adjusted R^2	F	N
Accessibility by car	0.031*	2.090	173	0.099**	2.356	173
Accessibility by public transport	0.012	1.406	169	0.160**	3.138	169
Office exterior and division	0.024*	1.899	181	0.180**	3.478	181
Office decor	0.013	1.531	179	0.126**	2.616	179
Seclusion rooms	0.022	1.632	138	0.156**	3.325	138
Entrée and atrium areas	-0.011	0.620	174	0.056*	1.686	174
Washroom facilities	0.037**	2.429	183	0.121**	3.291	183
Flexible workspaces	0.027	1.859	156	0.165**	3.374	156
Fixed workspaces	0.084**	3.811	153	0.123**	3.386	153
Adaptability furniture	0.048**	2.441	142	0.110**	2.959	142
Personal control indoor climate	-0.001	0.953	171	0.074**	1.975	171
Information and communication technology and equipment	-0.018	0.454	152	0.008	1.099	152
Office climate	-0.016	0.415	181	0.100**	2.263	181
Total user satisfaction with physical characteristics	0.027*	2.016	183	0.152**	3.739	183

Note: *Significance at the 90% confidence level; **significance at the 95% confidence level.

satisfaction. These results suggest that women are less satisfied with physical aspects compared with men. This is in line with previous research in single-tenant offices that showed that it is more important for women to have control over their work environment than for men (De Been & Beijer, 2014; Rothe et al., 2011).

Age also influenced total user satisfaction and user satisfaction with several physical characteristics. The results suggest that users older than 45 years are more satisfied with the office exterior and division, accessibility by public transport and adaptability of furniture than younger users. Moreover, users between 25 and 44 years old are less satisfied with seclusion rooms, entrée and atrium areas, and washroom facilities than very young users. An opposite result was found by Houben (2015) who showed that specifically young users (< 25 years old) and older people (> 55 years old) were less satisfied with accessibility (physical and digital) of offices. However, the study by Houben was conducted in single-tenant buildings instead of multi-tenants buildings.

Besides age and gender, education level also had a significant effect on user satisfaction, namely with office decor, washroom facilities, personal control of indoor climate, ICT and equipment, office climate, facilities and services, and canteen/restaurant/coffee/tea. De Been and Beijer (2014) showed similar relations between education level and the satisfaction with the layout of the office, indoor climate and facilities in single-tenant buildings.

The results show that people who work more than 40 hours a week are more satisfied with the office climate. This is an opposite result from research in single-tenant offices that showed that people who work 100% at the

office value the adjustability of the indoor climate as more important than people who work fewer hours at the office (Rothe et al., 2011). People who work more hours at the multi-tenant offices are less satisfied with flexible workspaces. These people spent more time in the office and therefore probably attach more value to a fixed workspace.

Work-related characteristics

With regard to work-related characteristics, significant correlations were found between current position and user satisfaction with the categories: accessibility by car and by public transport, office exterior and division, office decor, seclusion rooms, flexible workspaces, personal control of indoor climate, ICT and equipment, and office climate. These results suggest that managers and board member are more satisfied with these physical characteristics than regular employees or support staff.

The work environment (*i.e.* open or closed work environment) and workspace type (*i.e.* fixed or flexible workspace) showed significant correlations with user satisfaction too. For example, users who work in a flexible workspace were more satisfied with office exterior and division, office decor and flexible workspaces. Users who work in an open work environment were more satisfied with office exterior and division, seclusion rooms and adaptability of furniture of multi-tenant offices. Moreover, both users who work in an open work environment and users who work at a flexible workspace are overall more satisfied with the physical characteristics of multi-tenant offices. However, research in

Table 7. Significant results of multiple regression analyses (MRAs) (model II) with regard to personality.

Personality traits	User satisfaction with ...													
	Accessibility by car	Accessibility by public transport	Office exterior and division	Office decor	Seclusion rooms	Entrée and atrium areas	Washroom facilities	Flexible workspaces	Fixed workspaces	Adaptability of furniture	Personal control indoor climate	ICT and equipment	Office climate	Total user satisfaction
Extroversion	+	0	-**	0	-*	0	-**	0	0	0	-**	0	0	0
Agreeableness	0	0	+	0	+	0	0	+	+	+	0	0	0	+
Conscientiousness	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emotional stability	0	+	0	0	0	0	0	0	0	0	0	0	0	0
Openness to experience	0	0	+	+	0	0	+	0	0	-**	0	0	0	+

Note: *Significant at 90% confidence interval; **significant at 95% confidence interval; + = significant positive effect; - = significant negative effect; 0 = no significant effect.

Table 8. Spearman rho correlations (ρ).

	User satisfaction with facilities and services	User satisfaction with canteen/restaurant/coffee/tea	User satisfaction with privacy
Extroversion	-0.052	0.052	0.111*
Agreeableness	0.137*	0.047	0.102
Conscientiousness	0.070	-0.007	0.005
Emotional stability	-0.004	-0.015	-0.082
Openness to experience	0.098	0.132**	0.096

Note: *Significance at the 90% confidence level; **significance at the 95% confidence level.

single-tenant offices showed that open work environments could result in more noise, reduced privacy and difficulties performing work that needs concentration (Kim & de Dear, 2013). Flexible offices in single-tenant buildings could lead to problems, such as that people cannot find each other or a workplace (Van der Voordt & Van Meel, 2000).

Discussion and conclusions

There is a growing interest in how to influence user satisfaction. However, personality hardly received any attention in previous research on user satisfaction with the built environment. Especially in multi-tenant offices where organizations share facilities, spaces and services, research on user satisfaction in general is limited. This study therefore tried to contribute to the knowledge gap in the relation between user satisfaction and personality, demographics and work-related characteristics, which is important for user-centred design of multi-tenant offices.

In general, total user satisfaction is not bad in the multi-tenant offices studied (mean = 3.5); however, it is not much more than neutral, so there is much room for improvement. With regard to the influence of personality, it is not surprising that more agreeable people and those more open to new experiences are more satisfied in total and with several physical characteristics of the multi-tenant offices. It is unexpected that the extroverted users who could be considered as a main target group of some multi-tenant office types (*i.e.* co-working office) were less satisfied with both the exterior as several interior aspects than the introverted users. Thus, these multi-tenant office types could consider improving physical characteristics such as seclusion rooms, washroom facilities and personal control of the indoor climate to increase satisfaction of the tenants they specifically aim at.

Only agreeableness showed a significant positive effect on user satisfaction with facilities and services

(e.g. security and cleaning, networking events, training and workshops, car parking, support services, secretarial services and business services). For facility managers, it is important also to pay attention to the needs of people with a more critical attitude, as these are more likely to file complaints. If they could adapt their product to these needs, it could increase overall user satisfaction. Therefore, more in-depth research is needed into the relation between user differences (*i.e.* personality, demographics and work-related characteristics) and the satisfaction with each facility and service that can be offered in multi-tenant offices.

Demographics (*i.e.* age, gender and education level) and work-related characteristics (*i.e.* current position, work environment and workspace) appeared more important than personality in explaining total user satisfaction with physical characteristics of multi-tenant offices. Similar to previous single-tenant office studies (e.g. Gursoy, Geng-Qing Chi, & Karadag, 2013), several differences were found between different age groups with regard to their satisfaction. It is important for multi-tenant offices to adapt to changing needs and preferences of younger generations, as they will comprise an increasing part of their building population. If the different generations are to be kept satisfied, it seems best to offer more variety of (work) spaces and facilities. This would allow people a choice about how to fulfil their individual preferences. Further research is still needed on this topic.

Tenants of multi-tenant offices are frequently changing because of the flexible and short-lease contracts. Therefore, it is important for facility managers to monitor frequently the personal characteristics of their tenants and their perceived satisfaction to adapt to these changes and be able to improve satisfaction levels.

It was found that user satisfaction was not particularly influenced by the tenant organization's sector. Therefore, multi-tenant offices that focus on specific sectors should realize that this does not increase user satisfaction with the workplace. It can, of course, be relevant to increase synergy between tenants. A less surprising, but not less important, result is that users who can influence decisions about which multi-tenant office to choose (*i.e.* managers and board members) are more satisfied than regular employees. This indicates that in order to have satisfied personnel, top management must identify the needs of their employees more carefully and involve them in the decision-making process to select a new office. In addition, managers of multi-tenant offices could improve their customer relationship management by working together with managers and board members of organizations to create work environments that fit their needs and preferences.

Office climate remains one of the most dissatisfying characteristics of offices (e.g. De Been & Beijer, 2014), and this study showed that multi-tenant offices are no exception in this. It is therefore notable that people who worked more hours in a multi-tenant office were the most satisfied with the office indoor climate. It was expected that they would have higher demands for the office climate as they spend more time in it. Besides climate, open layouts and flexible workspaces have been shown to lead to problems in single-tenant offices too, such as more noise and reduced privacy (Kim & de Dear, 2013). On the contrary, this study showed that in multi-tenant offices the open and flexible work environment seems to have a positive relation on total user satisfaction. Thus, managers of multi-tenant offices, in contrast to managers of single-tenant offices, would best focus on offering a variety of fixed, flexible and open workspaces and facilities and services to increase user satisfaction.

The results of this study provide relatively new and interesting knowledge that could be useful for property (real estate) owners and developers. The current oversupply of offices and industrial buildings and the accompanying high vacancy rates mean the market changed from a supply- to a demand-driven office market, with a focus on the demand of users. Real estate owners and developers have been forced to think about user-centred designs, hence they try to develop offices that are distinctive due to high-quality and valued aspects for users. Often, vacant single-tenant buildings are being transformed into multi-tenant offices, for which the results here can provide input. For example, these transformed multi-tenant offices could provide more open and flexible workspaces to increase the overall satisfaction with the physical characteristics. Also, improving the (personal control of the) indoor climate could increase the satisfaction in multi-tenant offices. Offering a diverse range of workspaces, meeting rooms, concentration rooms and social spaces could increase user satisfaction and provide increased choice and personal influence for the more diverse group of tenants who usually accommodate such offices. Last, focusing on the preferences of extroverted workers with regard to office exterior and division (*i.e.* architecture of the building, office type and subdivision of the office) could increase overall user satisfaction as they form a large part of multi-tenant office populations.

For future research, the inclusion of additional variables could strengthen the analyses. The relatively low percentages of explained variance (maximal 18%) of all the performed models showed that there could be more variables that affect user satisfaction with physical characteristics. Interaction variables or variables that

Table 9. Significant results of multiple regression analyses (MRAs) (model II) with regard to demographics.

		User satisfaction with ...													
		Accessibility by car	Accessibility by public transport	Office exterior and division	Office decor	Seclusion rooms	Lobby and atrium areas	Washroom facilities	Flexible workspaces	Fixed workspaces	Adaptability of furniture	Personal control indoor climate	ICT and equipment	Office climate	Total user satisfaction
Demographic characteristics	Female	–*		–*		0		–**				–**	0	–*	–**
	25–44 years		0	0	0	–*	–**	–*				0	0	0	0
	≥ 45 years old		+**	+*	0	0	0	0			+*	0	0	0	+**
	Vocational level				+**			0				+*	0	+*	0
	Undergraduate level				0			0				0	0	0	0
	Car, < 1/week		–*												
	Car, 1–2/week		–*												
	Car, 3–4/week		–*												
	Car, always		–*												
	PT, < 1/week		0												
	PT, 1–2/week		0												
	PT, 3–4/week		+*												
	PT, always		0												
	Bicycle, < 1/week				0										
	Bicycle, 1–2/week				–**										
	Bicycle, 3–4/week				0										
	Bicycle, always				0										
	Walking, < 1/week	+**						+*							
	Walking, 1–2/week	0						0							
	Walking, 3–4/week	0						0							
Walking, always	–*						–**								

Note: *Significant at 90% confidence interval; **significant at 95% confidence interval; + = significant positive effect; – = significant negative effect; 0 = no significant effect. Not entered in MRAs (not significant in bivariate analyses).

Table 10. Significant results of multiple regression analyses (MRAs) (model II) with regard to work-related characteristics.

		User satisfaction with ...														
		Accessibility by car	Accessibility by public transport	Office exterior and division	Office decor	Seclusion rooms	Lobby and atrium areas	Washroom facilities	Flexible workspaces	Fixed workspaces	Adaptability of furniture	Personal control indoor climate	ICT and equipment	Office climate	Total user satisfaction	
Work-related characteristics	Personal services sector	0					–*			0						
	Business-oriented sector	–*					0			–*						
	Technical-oriented sector	–*					0			0						
	Other sectors	0					0			0						
	Temporary employment													0		
	Student														+*	
	Manager				+**	+*			+*			+**			+*	
	Board member			+**	+*	+*			+**			+*	–**		+*	
	Work 17–24 hours/week								0						0	
	Work 25–32 hours/week								0						0	
	Work 33–40 hours/week								0						0	
	Work ≥ 41 hours/week								–*						+*	
	Open work environment			+*		+*			0	0		+*	0			+*
	Flexible workspace			+*	+*					+*		0	0			+*

Note: *Significant at 90% confidence interval; **significant at 95% confidence interval; + = significant positive effect; – = significant negative effect; 0 = no significant effect; not entered in MRAs (not significant in bivariate analyses).

focus on the quality or importance of characteristics of the current work environment could also explain additional variance.

One of the main limitations of this research is that the physical characteristics of the current work environment of respondents were not included. Therefore, it is not possible to analyse the relation of individuals' current physical work environment and their satisfaction with this work environment. For example, people who work at a multi-tenant office with a large number of meeting rooms are probably more satisfied with this aspect than those who work at a multi-tenant office without any meeting rooms. In addition, the needs for specific activities (e.g. a quiet room for work that requires concentration) were not taken into account. Therefore, an understanding of the activity based needs of users could give more insight in user satisfaction.

The respondents who participated in this study show a low variety in personality differences, namely most respondents are extroverted, agreeable, conscientious, emotionally stable and open to new experiences. Due to the low variety, the results probably showed fewer correlations between personality traits and user satisfaction than expected. Future research could analyse more in-depth personality differences of multi-tenant office users with regard to user satisfaction.

Moreover, increasing the sample size and collecting data from other countries is important to increase the generalizability of the results. In addition, analysing the differences between the different types of multi-tenant offices with regard to user satisfaction would give more insight into different user groups and their preferences.

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References

- Ashton, M.C., Lee, K., & Paunonen, S.V. (2002). What is the central feature of extraversion? Social attention versus reward sensitivity. *Journal of Personality and Social Psychology* 83(1), 245–252.
- Bakker, I., Van der Voordt, T., Vink, P., de Boon, J., & Bazley, C. (2015). Colour preferences for different topics in connection to personal characteristics. *Color Research & Application*, 40(1), 62–71. doi:10.1002/col.21845
- Barber, C., Laing, A., & Simeone, M. (2005). Global workplace trends: A north American and European comparison. *Journal of Corporate Real Estate*, 7(3), 210–221. doi:10.1108/14630010510631063
- Barrow, C. (2001). *Incubator: A realist's guide to the world's new business accelerators*. West Sussex, UK: John Wiley & Sons.
- Bhatti, M. A., Kaur, S., & Battour, M. M. (2013). Effects of individual characteristics on expatriates' adjustment and job performance. *European Journal of Training and Development*, 37(6), 544–563. doi:10.1108/EJTD-02-2013-0013
- Bodin Danielsson, C., & Bodin, L. (2008). Office type in relation to health, well-being, and job satisfaction among employees. *Environment and Behavior*, 40(5), 636–668. doi:10.1177/0013916507307459
- Borkenau, P., & Ostendorf, F. (2008). *NEO-FFI. NEO-Fünf-Faktoren-Inventar nach Costa und McCrae* (2., vollständig überarbeitete Auflage). Göttingen: Hogrefe.
- Bozionelos, N. (2004). The big five of personality and work involvement. *Journal of Managerial Psychology*, 19(1), 69–81. doi:10.1108/02683940410520664
- Brill, M., & Weidemann, S. (2001). *Disproving widespread myths about workplace design*. Jasper: Kimball International.
- Brown, Z., & Cole, R. J. (2009). Influence of occupants' knowledge on comfort expectations and behaviour. *Building Research & Information*, 37(3), 227–224. doi:10.1080/09613210902794135
- Brunia, S., Van der Voordt, T., & Appel-Meulenbroek, R. (2016). Satisfaction. In P. A. Jensen & T. Van der Voordt (Eds.), *Facilities management and corporate real estate management as value drivers: How to manage and measure adding value* (pp. 67–82). Oxon: Routledge. Chapter 5.
- Calder, M., & Courtney, S. (1992). Business centres: The UK picture. *Property Management*, 10(2), 106–117. doi:10.1108/02637479210030268
- Craik, K. H. (1966). *The prospects for an environmental psychology* (IPAR Research Bulletin). University of California Press, Berkeley CA.
- De Been, I., & Beijer, M. (2014). The influence of office type on satisfaction and perceived productivity support. *Journal of Facilities Management*, 12(2), 142–157. doi:10.1108/JFM-02-2013-0011
- De Been, I., Beijer, M., & Den Hollander, D. (2015). *How to cope with dilemmas in activity based work environments: Results from user-centred research*. European facility management conference, Glasgow, 2–3 June.
- De Vries, J., Van der Voordt, T., & Arkestijn, M. (2004). H10 Afstemming organisatie en vastgoed. In *Inleiding Vastgoedmanagement* (pp. 164–183). Delft: Delft University of Technology, Faculty of Architecture: and the Built Environment.
- Earle, H. (2003). Building a workplace of choice: Using the work environment to attract and retain top talent. *Journal of Facilities Management*, 2(3), 244–257. doi:10.1108/14725960410808230
- Frontczak, M., Schiavon, S., Goins, J., Arens, E., Zhang, H., & Wargocki, P. (2012). Quantitative relationships between occupant satisfaction and satisfaction aspects of indoor environmental quality and building design. *Indoor Air*, 22(2), 119–131. doi:10.1111/j.1600-0668.2011.00745.x
- Furnham, A., Eracleous, A., & Chamorro-Premuzic, T. (2009). Personality, motivation and job satisfaction: Hertzberg meets the Big Five. *Journal of Managerial Psychology*, 24(8), 765–779.

- Fuzi, A., Clifton, N., & Loudon, G. (2014). *New in-house organizational spaces that support creativity and innovation: The co-working space*. Paper presented at research & development management conference, Stuttgart.
- Gensler. (2005). *The four walls – the real British office*. London: Gensler.
- Gibson, V.A., & Lizieri, C. M. (1999). *Change & flexibility. The role of serviced office space in office markets and corporate property portfolios*. Whiteknights, Reading: Department of Land Management and Development.
- Goslin, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality*, 37, 504–528. doi:10.1016/S0092-6566(03)00046-1
- Grimaldi, R., & Grandi, A. (2005). Business incubators and new ventures creation: an assessment of incubating models. *Technovation*, 25, 111–121.
- Gursoy, D., Geng-Qing Chi, C., & Karadag, E. (2013). Generational differences in work values and attitudes among frontline and service contact employees. *International Journal of Hospitality Management*, 32, 40–48. doi:10.1016/j.ijhm.2012.04.002
- Hills, R., & Levy, D. (2014). Workplace design and fit-out: What knowledge workers value. *Property Management*, 32 (5), 415–432. doi:10.1108/PM-02-2014-0011
- Hogan, J., & Holland, B. (2003). Using theory to evaluate personality and job performance relations: a socioanalytic perspective. *Journal of Applied Psychology*, 88, 100–112.
- Houben, B. (2015). Satisfaction with physical working environment. The effect of age on satisfaction with characteristics of the physical working environment. Master thesis. Eindhoven: Eindhoven University of Technology, Department of Architecture, Building and Planning.
- Judge, T. A., Bono, J. E., & Locke, E. A. (2000). Personality and job satisfaction: The mediating role of job characteristics. *Journal of Applied Satisfaction*, 85, 237–249.
- Kampschroer, K., & Heerwagen, J. H. (2005). The strategic workplace: Development and evaluation. *Building Research & Information*, 33(4), 326–337. doi:10.1080/09613210500161976
- Ketting, J. R. (2014). *Het bedrijfsverzamelgebouw. Een onderzoek naar de voordelen van bedrijfsverzamelgebouwen*. Delft: Delft University of Technology. Department of Real Estate and Housing.
- Kim, J., & de Dear, R. (2013). Workspace satisfaction: The privacy–communication trade-off in open-plan offices. *Journal of Environmental Psychology*, 36, 18–26. doi:10.1016/j.jenvp.2013.06.007
- Koster, H. M. (2009). *De relatie tussen belevingswaarde en gebruikersparticipatie bij vastgoedprocessen binnen defensie*. Enschede: University of Twente, Department of Engineering Technology.
- Lee, S. Y. (2006). Expectations of employees toward the workplace and environmental satisfaction. *Facilities*, 24(9/10), 343–353. doi:10.1108/02632770610677628
- Liao, H., & Chuang, A. (2004). A multilevel investigation of factors influencing employee service performance and customer outcomes. *Academy of Management Journal*, 47(1), 41–58.
- Liebrechts, M. M. M. (2013). *The modern work environment in different countries. How do employee preferences differ with regard to the modern work environment between countries?* Eindhoven: Eindhoven University of Technology, Department of Architecture, Building and Planning.
- Lindahl, G., Hansen, G., & Alexander, K. (2012). The usability of facilities: Experiences and effects. In K. Alexander & I. Price (Eds.), *Managing organizational ecologies: Space, management and organization* (pp. 105–116). New York: Routledge.
- Loewenthal, K. M. (1996). *An introduction to psychological tests and scales*. London, England: UCL Press.
- Lokhorst, J., Remøy, H., & Koppels, P. (2013). Verborgen leegstand. *Real Estate Research Quarterly*, 12 (3), 6–16.
- Maarleveld, M., Volker, L., & Van der Voordt, T. J. M. (2009). Measuring employee satisfaction in new offices – the WODI toolkit. *Journal of Facilities Management*, 7(3), 181–197. doi:10.1108/14725960910971469
- Matzler, K., Renzl, B., Müller, J., Herting, S., & Mooradian, T. A. (2008). Personality traits and knowledge sharing. *Journal of Economic Psychology*, 29, 301–313. doi:10.1016/j.joep.2007.06.004
- Mawson, A. (2002). *The workplace and its impact on productivity*. London: Advanced Workplace Associates.
- McCoy, J. M. (2005). Linking the physical work environment to creative context. *The Journal of Creative Behavior*, 39 (3), 167–189. doi:10.1002/j.2162-6057.2005.tb01257.x
- McCoy, J. M., & Evans, G. (2005). Physical work environment. In J. Barling, E.K. Kelloway, & M. Frone (Eds.), *Handbook of work stress* (pp. 219–245). Thousand Oaks: Sage.
- Moore, G. T. (1980). Holism, environmentalism and the systems approach. *Man–Environment Systems*, 10(1), 11–21.
- Newsham, G., Brand, J., Donnelly, C., Veitch, J., Aries, M., & Charles, K. (2009). Linking indoor environment conditions to job satisfaction: A field study. *Building Research & Information*, 37(2), 129–147. doi:10.1080/09613210802710298
- Oseland, N. (2009). The impact of psychological needs on office design. *Journal of Corporate Real Estate*, 11(4), 244–254. doi:10.1108/14630010911006738
- Pallant, J. (2010). *SPSS survival manual. A step by step guide to data analysis using SPSS* (4th ed.). Berkshire: McGraw-Hill.
- Perkins, A. (2016). *The welfare trait: How state benefits affect personality*. Basingstoke, UK: Palgrave MacMillan.
- Price, J., & Spicer, T. (2002). *The performance of business centres over a complete business cycle*. London: Business Centre Capital.
- Remøy, H., & Van der Voordt, T. J. M. (2014). Priorities in accommodating office user preferences: Impact on office users decision to stay or go. *Journal of Corporate Real Estate*, 16(2), 140–154. doi:10.1108/JCRE-09-2013-0029
- Riratanaphong, C., & Van der Voordt, T. (2011). *Impact of workplace change on satisfaction and productivity*. Presented at the 10th EuroFM research symposium, Vienna.
- Rothe, P., Beijer, M., & Van der Voordt, T. (2011). *Most important aspects of the work environment: A comparison between two countries*. Paper presented at 10th EuroFM research symposium, 24–25 May, Vienna.
- Sailer, K., Pomeroy, R., & Haslem, R. (2015). Data-driven design-using data on human behaviour and spatial configuration to inform better workplace design. *Corporate Real Estate Journal*, 4(3), 249–262.
- Sapsford, R. (1999). *Survey research*. London: Sage.

- Schmitt, B. (1999). Experiential marketing. *Journal of Marketing Management*, 15(13), 53–67. doi:10.1362/026725799784870496
- Schwede, D., Davies, H., & Purdey, B. (2008). Occupant satisfaction with workplace design in new and old environments. *Facilities*, 26(7/8), 273–288. doi:10.1108/02632770810877930
- Thompson, B., & Jonas, D. (2008). *Workplace design and productivity: Are they inextricably linked?* London: Royal Institute Charter of Surveyors.
- Van den Berg, J., & Stijnenbosch, M. H. (2009). *Atlas bedrijventra: een inventarisatie van bedrijventra met voorzieningen*. Nieuwegein: STOGO onderzoek+Advies.
- Van der Voordt, D. J. M. (2004). Productivity and employee satisfaction in flexible workplaces. *Journal of Corporate Real Estate*, 6(2), 133–148. doi:10.1108/14630010410812306
- Van der Voordt, D. J. M., & Van Meel, J. J. (2000). Lessons from innovations. In G. Dewulf, P. Krumm, & H. de Jonge (Eds.), *Successful corporate real estate strategies* (pp. 51–64). Nieuwegein: Arko.
- Van Susante, P. J. M. (2014). *Differences in employee satisfaction in new versus traditional work environments*. Eindhoven: Eindhoven University of Technology, Department of Architecture, Building and Planning.
- Veitch, J.A., Charles, K.E., Newsham, G.R., Marquardt, C.J.G., & Geerts, J. (2003). *Environmental satisfaction in open-plan environments: 5 workstation and physical condition effects*. Ottawa: National Research Council Canada, Institute for Research in Construction.
- Vischer, J. C. (2008). Towards an environmental psychology of workspace: How people are affected by environments for work. *Architectural Science Review*, 51(2), 97–108. doi:10.3763/asre.2008.5114
- Volker, L., & Van der Voordt, D. J. M. (2005). *Werkomgevingsdiagnose-instrument. Methoden voor het meten van de prestaties van kantoorhuisvesting*. Delft: Centre for People and Buildings.
- Weijs-Perrée, M., Appel-Meulenbroek, H. A. J. A., De Vries, B., & Romme, S. (2016). Differences between business center concepts in The Netherlands. *Property Management*, 34(2), 100–119. doi:10.1108/PM-04-2015-0015
- Wells, M., & Thelen, L. (2002). What does your workspace say about You?: The influence of personality, status, and workspace on personalization. *Environment and Behavior*, 34(3), 300–321. doi:10.1177/0013916502034003002
- Wolff, H.G., & Kim, S. (2012). The relationship between networking behaviours and the Big Five personality dimensions. *Career Development International*, 17(1), 43–66.
- Zimring, C., Dogan, F., Dunne, D., Fuller, C., & Kampschroer, K. (2005). The facility performance evaluation working group. In W. F. E. Preiser & J. C. Vischer (Eds.), *Assessing building performance* (pp. 180–187). Oxford: Elsevier.