

Does facility management affect perception of building quality?

A study of cooperative residential buildings in Sweden

Residential
buildings in
Sweden

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Abstract

Purpose – This paper aims to examine the strategy, selection and perception of facility management (FM) services and the effect it may have on perceived building quality.

Design/methodology/approach – Data was collected through a survey distributed to board members of cooperatives for newly constructed buildings in Sweden. Responses from 394 cooperative boards were included in the data set and analysed. The difference in cooperative choice of FM strategy and satisfaction with FM services was examined with non-parametrical Kruskal–Wallis tests and the effect of FM strategy and satisfaction with FM services on perceived building quality was examined with a one-way analysis of variance (ANOVA) test.

Findings – The results suggest information asymmetry and indicate urgent need for an objective accreditation system for FM services, which will inform and assist housing owners in the FM selection process. The study validates the hypothesis that facilities management strategies applied by housing cooperatives have a significant effect on perception of building quality.

Practical implications – The findings will assist developers, facility and property managers to understand the needs and services valued by the housing cooperative. The findings highlight the information asymmetry, restricted techniques and weak signalling methods among FM services, and advocates promoting an objective accreditation system for FM services.

Originality/value – The study contributes to the discussion on the concept of building quality and the results presented provide a better understanding of facilities management strategy on perception of building quality.

Keywords Facilities management, Property management, Cooperatives, Sweden, Residential buildings, Quality

Paper type Research paper

Introduction

Increasing legislative pressure and environmental awareness advance the role of property and facility management in reducing the environmental impact of the built environment. It has been argued that facilities managers are in the position of influencing and changing the behaviour of tenants, and initiating and maintaining actions towards resource-efficient



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building operation and sustainable city development (Elmualim *et al.*, 2010). The change can only take place if it is conducted in collaboration with residents and property owners, as it is the property owner who decides how to manage the property. In the case of cooperative residential buildings, the role, the scope of services and responsibilities of facilities services provider may vary depending on the management strategy decided by the estate owners (Lai, 2011; Yip *et al.*, 2007).

Property and facilities management in cooperative residential building settings have been studied from different perspectives: focussed on facility management (FM) performance (Hui *et al.*, 2011), scope of services (Lai and Yik, 2006; Lai, 2014), choice of FM (Christudason, 2008; Yip *et al.*, 2007), customer satisfaction (Sia *et al.*, 2018), collective engagement (Yau, 2011; Ho and Gao, 2013; Yau, 2014; Gao, 2015) and sustainability applications in FM (Elmualim *et al.*, 2010; Guilding *et al.*, 2015).

Relatively few research studies have investigated the relationship between perceived building quality and property management strategies. Ho and Liusman (2016) explored the relationship between FM and building quality; however, the main focus was on FM performance and customer satisfaction. Hui *et al.* (2011) debated building quality indirectly, focussing on the relationship between property management performance and property price. Yau (2014) also indirectly discussed building quality when studying owners' engagement in property management and their perceived influence on the management outcome. Other researchers investigated occupants' opinions on indoor environmental quality as a proxy for building quality (Zalejska-Jonsson, 2014) or discussed quality measured by defects reported by homeowners (Auchterlounie, 2009); however, the FM dimension was not part of the studies.

This paper contributes to the body of knowledge on housing property and facilities management by examining the strategy, selection and perception of FM services and the effect it may have on perceived building quality in residential cooperatives estates in Sweden.

Outsourcing and selection of facility management service provider

Outsourcing property management (PM) or FM involves transferring the management and decision making authority of an operation to an external organisation (Kurdia *et al.*, 2011), not only reducing the degree of control but also the need for day-to-day involvement. Alternatively, a housing cooperative may choose out-tasking and source services for specific tasks, retaining management and decision making position, and thus, a high degree of authority and control.

The choice of management strategies is complex. Earlier studies present inconclusive findings, demonstrating that both in-house and outsourcing strategies have potential benefits as well as risks and drawbacks (Yip *et al.*, 2007; Christudason, 2008; Lam, 2011; Carswell, 2017; Carswell, 2018).

The principal argument for outsourcing FM services has been efficiency and cost-saving. Lam (2011) found that the cost of FM when outsourced may be significantly lower than the in-house option. The significant cost savings from outsourcing can be achieved in a contestable market because competitiveness invokes effectiveness in organisational and technological skills (Lam, 2011; Lam, 2012; Carswell, 2017). However, there is evidence that self-management, performing FM/PM tasks and owners taking management roles lower operation expenses (Carswell, 2017).

Making a choice between the two different strategies of FM/PM requires of the clients/owners an extensive knowledge of the market. Studies found that the main risks associated with outsourcing of FM services are poor quality of service, low security and inexperienced

clients (Ikediashi *et al.*, 2012). Recognizing the risks related to outsourcing the services and the potential problems that can arise in a principal-agent relationship (Jensen and Meckling, 1976), the property owner needs to acquire knowledge of the market and establish a control system to secure quality of services before delegating duties.

The main problems in making an informed decision are information asymmetry and difficulty in recognizing trustworthy information. The literature shows that both the (potential) customer and the service supplier are aware of the information asymmetry problem, and therefore, the seller (the signaller) sends cues about the product or service to reduce information asymmetry and the buyer (receiver) looks for signals indicating quality, trustworthiness, expertise and experience (Akerlof, 1970; Doney and Cannon, 1997; McKnight *et al.*, 2002; Walker and Johnson, 2009; Ho and Wei, 2016). The studies have shown that signalling a good corporate image has been perceived as an important cue for an unobserved quality (Jha *et al.*, 2013). Accreditations and external certifications are also perceived as an approach to reducing information asymmetry and providing the buyer with an assurance of the standard and service quality provided (Walker and Johnson, 2009). Independent accreditations and certifications also serve as a signal of trust (Hui *et al.*, 2011; Li and Monkkonen, 2014). Property management literature has shown that the quality certifications for FM/PM have a significant effect on property value (Hui *et al.*, 2011). However, findings from the same study indicate that not all forms of certification are perceived as trustworthy and translate into added value. Findings by Hui *et al.* (2016) show that a property price premium was found for properties managed by PM companies, which have been awarded ISO 14001 certification and a local environmental award, but not for the companies, which obtained the ISO 14001 certification only.

In a study focussing on a strategic evaluation model for selecting consultants in the privatisation of professional housing maintenance services, the authors identified past performance as the strongest predictor of quality service performance (Lam, 2008). The authors found price to be an inconclusive predictor and size of company to be insignificant for the output performance. This is an interesting finding as it evokes the question of how the buyer can obtain information about companies' past performance.

The literature suggests that internet discussion forums had a significant effect on customers' behaviour (Bickart and Schindler, 2001); hence, it is rational to assume that internet discussion forums or social media channels could be considered as a source of information about companies' past performance. However, the question remains whether this source of information can be considered credible (Tuttle, 2012, August 28). A company's website might be considered as a potential source of information as well. Some researchers suggest that a company's website can be a viable signal of product quality and most effective in situations of high information asymmetry and high signal credibility (Wells *et al.*, 2011).

Consumer experience is a joint, subjective response to the service and product encounter, and is holistic in nature (Glöckner and Bröder, 2011). The response is formed as a combination of offerings directly and indirectly related to the company and customer engagement (Glöckner and Bröder, 2011; Eisenbeiss *et al.*, 2014). Hui and Zheng (2010) used structural equation modelling to show statistical evidence of a significant relationship between customer satisfaction, management quality and service quality. The authors determined that professional knowledge of staff, consciousness of cleaning services, safety and security had the greatest effect on perception of FM service. Levy and Sim (2014) studied house owners' satisfaction by exploring factors affecting owners' decision to switch property management providers. The results show that untrustworthiness, failure to listen to clients' needs or failure in meeting client's expectations, a sense of neglect and pricing/

charging practices were identified as some of the main reasons for dissatisfaction with FM services.

Building quality

Quality is considered as a multi-faceted and multi-layer notion, as it relates to functional and non-functional needs that can be fulfilled and evoke different levels of satisfaction (Baines *et al.*, 2017). The quality of a building can be defined as an assessment of function, aesthetics, cost and time, environment, health and safety, use of material, longevity and reliability (Barrett, 2000; Holt and Rowe, 2000). Quality can be determined by the degree of compliance to specifications or standards or evaluated by users, expressing individual's relativistic evaluation (Forsythe, 2008). The latter is often referred to as perceived quality because each person has their own definition of quality and uses their own reference frame in the evaluation process (Baines *et al.*, 2017). The perception of quality can, therefore, be affected by personal beliefs and values (Holt and Rowe, 2000; Mohr-Jackson, 1998). The building users' quality judgement happens while they participate in consumption activities, and therefore, can be also referred to as experienced quality. Chang and Hoeng (2010) conceptualised experienced quality and identified five dimensions, namely, physical surrounding, the service provider, other customers, customers' companions and the customers themselves.

Another aspect that may affect perception of quality is brand, which may relate to construction company status and customer loyalty (Fauzi and Abidin, 2012), area or building characteristics. Researchers have found a significant relationship between housing price and brand (Benjamin *et al.*, 2006; Roulac, 2007), housing price and aesthetics and utility (Roulac, 2007), where the latter variables, as defined earlier, constitute aspects of quality.

The premise that the price has an effect on perceived quality has been studied by many scholars. General marketing studies found sometimes contradicting results, for example, Zeithaml (1988) found no support for the hypothesis, whereas others confirmed the relationship between price and perceived quality (Völckner and Hofmann, 2007). The real estate literature has generously explored the relationship between estate price and quality (Malpezzi *et al.*, 1987; Ooi *et al.*, 2014). A few researchers explored the effect of maintenance on house prices (Knight and Sirmans, 1996; Wilhelmsson, 2008) and found that maintenance level has an impact on depreciation rate, with rates being significantly lower for well-maintained property than for a property that is not maintained.

A number of studies have shown that assessment of building quality may depend on the user's perceived and acceptable level of quality, the severity of problems experienced with indoor environment, and reported building defects (Forsythe, 2006; Sommerville and McCosh, 2006; Forsythe, 2008; Auchterlounie, 2009; Christiansen, 2011). Reported defects and customer satisfaction were often used as a quality measure in building quality studies (Sommerville and McCosh, 2006; Auchterlounie, 2009; Mills *et al.*, 2009; Forcada *et al.*, 2012; Pan and Thomas, 2014; Zalejska-Jonsson, 2014; Forcada *et al.*, 2016; Milion *et al.*, 2017). The defects frequently reported by the owners are often aesthetical, such as problems with finishing, floors, tiles or painting or functional, for instance, problems with windows, doors or installations (Forcada *et al.*, 2012; Forcada *et al.*, 2016; Rotimi *et al.*, 2015; Pan and Thomas, 2014). The functional problems experienced by the occupants may also have a negative effect on customer satisfaction (Milion *et al.*, 2017).

Considering that the assessment of quality is an accumulation of different cues, both functional and emotional characteristics (Chang and Horng, 2010; Holt and Rowe, 2000; Mohr-Jackson, 1998), it is interesting to investigate how various signals of a product and

services impact the assessment of a building's quality. This study attempts to investigate this question in the context of ownership and management of residential buildings.

Facility management strategy: the context of housing cooperatives in Sweden

In Sweden, the housing stock is divided almost equally between single and multifamily buildings, approximately 40 per cent of all multifamily buildings being owned and operated by cooperatives semiconductor bridge. Housing residents are members of the cooperative and consequently co-own and co-manage buildings (Anund Vogel *et al.*, 2016). The decisions about investments, costs, building operation, management and maintenance are usually taken by a housing cooperative board, elected by the cooperative's members (Anund Vogel *et al.*, 2016). The administrative, financial, technical and legal responsibilities can either be fulfilled by the cooperative's members themselves or outsourced. The housing cooperation's choice to outsource services falls under the definition of outsourcing that is considered to be a strategic choice between use of internal or external resources (Katzler *et al.*, 2017).

In the case of commercial real estate, the decision to outsource is usually shaped by a firm's core business, risk and cost (operations, transaction, offered and requested services), competencies (Kimblar and Rutherford, 1993; Damodaran, *et al.*, 1997; Matsham and Heywood, 2012; Palm, 2015; Katzler *et al.*, 2017) and market competitiveness (Lam, 2012). These issues certainly apply to decisions made by housing cooperatives; however, the factors affecting these decisions may be different from those commonly applied in a firm. For example, relativity in assessment of costs may play an important role (Kahneman and Tversky, 1979), as it relates to the private time and commitment of cooperative members. Members' willingness and possibility to commit defines the resources of competence and knowledge that are accessible to cooperatives. These factors will shape a housing cooperative's decision to outsource services but also the scope of transferred responsibility and degree of control.

The strategy of cooperatives to outsource facility services may include outsourcing total facilities management (one provider), and outsourcing or out-tasking various related jobs, for example, maintenance or repair. Alternatively, the cooperative may choose to engage its own members by placing responsibility on them for tasks allocated by owners/residents.

The concepts "PM" and "FM" have been used in housing management literature equivalently. For the purpose of this paper, we distinguish between property management and facilities management and define facilities management services in line with the CEN (2006) definition of "services, which are provided to support and improve the effectiveness" of activities (as cited in Andersen *et al.*, 2014, p. 35). The approach taken in this paper assumes that property management is related to management on both operational and strategic levels (Yiu *et al.*, 2006), with the aim of securing owners' interest in the short and long perspective. An FM service provider can be internal or external (Andersen *et al.*, 2014). In the case of this study, the cooperative (the owners themselves) is considered as an internal FM service provider and the external FM service provider is defined as a company contracted to provide specific services such as indoor cleaning, landscaping, or maintenance. Our understanding is that main control over and right to the property are in the hands of the owners/cooperative board, regardless of the cooperative's decision to delegate administration of services to the internal or external provider.

The aim of this paper is threefold. First, the intention is to examine the approach used by housing cooperative boards towards facilities management. A particular focus lies on the FM outsourcing strategy, the source of information and the factors affecting choice of FM providers. Second, the satisfaction with different FM services is analysed and finally, the

effect of FM strategy and satisfaction from services on perceived building quality is investigated.

Method

Data collection

Data was collected through a survey. A questionnaire that consists of 30 questions was posted by regular mail in the autumn of 2015. The aimed population was cooperatives that own buildings completed between 2008 and 2013. A total of 1,390 questionnaires were addressed to boards of regular cooperative residential buildings in Sweden. Some responses indicated that cooperatives own buildings dated 2007 and 2006. As a residential project may include a number of building constructed in different phases it is likely that a cooperative may own buildings constructed in different years. A total of 394 complete responses from cooperatives of estates constructed between 2006 and 2013 are, therefore, included in the data set. Considering the aim of the study and the fact that latent defects may become visible after a few years of operation (Chong and Low, 2006), the variable *estate construction year* represents the year the first occupants moved in in the estate.

Respondents were asked to answer questions related to strategy for FM, choice of and satisfaction with, FM services. The strategy for FM is measured by the degree of control that owners are willing to waive for the disposition of complex management tasks. The housing cooperative can choose to perform all FM activities (internal FM service provider), which indicates high control preference, or to outsource to one or a few external providers – suggesting relatively low need for control by the cooperative board.

The satisfaction with FM is measured by the subjective opinion of housing cooperative board members with the following services, namely, (technical) operation and maintenance, bookkeeping and taxation, outdoor and indoor maintenance services. The scale for satisfaction with services is from 1 to 3, where 1 has been allocated for answers indicating dissatisfaction with services, 2 with partial satisfaction and 3 for generally satisfied.

The perceived building quality is measured by reported defects in the buildings. The survey respondents have stated their experience of defects related to: windows, facade, balcony, drainage and plumbing; heating system, ventilation system, kitchen ventilation; indoor doors, finish and appliances. Based on those answers, a perceived building quality index has been created as a row average for all the problems in the building. The index applies the following scale: for value “1” – no problem has been reported, for value “2” – minor problems reported, “3” – severe problems reported. Details on defects reported by cooperatives owner are presented in a separate paper (*anonymised*).

Hypothesis

Considering previous research and findings on the relationship between customer satisfaction and perceived quality (Kim and Choi, 2013), it is proposed that cooperatives' perception of building quality (expressed by perceived building quality index) is affected by degree of control in property management, expressed by choice of FM strategy. Therefore, the first hypothesis is:

- H1. The perceived building quality index increases with the decrease of degree of control.

The expectation is that perceived building quality is lower when cooperatives indicate dissatisfaction with FM services; hence, the second premise is:

H2. The perceived building quality index increases with the decrease of satisfaction with FM services.

Analysis

An analyses was conducted whether FM strategy and satisfaction with services differ depending on: geographical location, size of cooperative (expressed in number of dwellings, total living area and number of buildings included in an estate), estate construction year, size of developers' and contractor's company (measured in official number of employees). Analysis has been conducted with non-parametrical Kruskal-Wallis tests due to the categorical nature of the data (Sheskin, 2000). To be able to compare different groups with each other, for significant results ($p < 0.05$), a post-hoc Dunn's test has been conducted. The Dunn's test (Benjamini-Hochberg procedure) allows for post-hoc comparison between groups with adjustment for multiple testing (Thissen *et al.*, 2002). The Benjamini-Hochberg procedure tests difference in responses between the groups and controls for the false discovery rate in multiple comparison (Thissen *et al.*, 2002).

The perceived building quality index distribution follows a normal distribution; therefore, testing of hypothesis is performed with one-way analysis of variance (ANOVA). The ANOVA test informs about the difference in means between groups; however, outputs do not state, which groups differ from each other. A post-hoc Bonferroni test was conducted to identify, which pairs are different and to examine any significance in difference between the groups. A post-hoc Bonferroni is also used to control for the family-wise error rate (Cramer *et al.*, 2016).

The computed Cronbach's alpha coefficient for reliability scale, with 19 items in the scale, was 0.77 and considered as satisfactory. The analysis was conducted with statistical package STATA 14.

Results

Characteristics of cooperatives

The cooperatives, which took part in the survey own estates constructed between 2006 and 2013, the total number being 394. The estates comprise of 3 to 253 dwellings (on average 42, standard dev. 30.47), 1 to 34 buildings (on average 3 buildings, standard dev. 4.68) and with an overall average living area of 3,455 m² (standard deviation of 2,369 m²). The cooperative board usually includes 3 to 5 regular members. The base knowledge in cooperatives that have responded to the survey included members with education/practical knowledge within economics (82 per cent), technical subjects (79 per cent), construction and real estate management (36 per cent).

Approximately, 83 per cent of the cooperatives are located in big (27 per cent) or medium-sized cities (27 per cent) and suburban municipalities around big cities (28 per cent). This is expected, as new apartment construction is mainly concentrated in these areas. The distribution of collected responses reflects the distribution of population.

Choice of facility management strategy

The majority (57 per cent) of cooperatives choose to outsource different facility services to various companies (Table I), signing a number of contracts with companies specializing in a particular FM service, such as accountancy and tax consulting, technical support or landscaping and gardening services. One in four cooperatives uses one company for managing all the activities related to FM.

The results show that choice of FM strategy differs depending on geographical location, size of cooperative and even size of developer and of contractor (Table II).

A statistically significant relationship was found between cooperative size (number of dwellings, living area and number of buildings) and the strategy for in-house/outsourcing of facility services (Kruskal–Wallis test with tiles, $p < 0.05$; Table II).

The cooperatives, which are relatively small (with up to 15 dwellings) are more likely to keep services in-house. With increase in size, the cooperatives tend to move towards outsourcing the services to a few companies or even to one general management company. Pairwise comparison confirms statistical significance.

The cooperatives located in big (including suburban municipalities) and medium-sized cities are more likely to contract FM services to one external provider. Conversely, cooperatives located in suburban municipalities to larger cities, commuter municipalities and sparsely populated municipalities are more likely to outsource specific FM tasks and conduct the majority of tasks in-house. The statistical significance was confirmed by a pairwise comparison test (Benjamini-Hochberg).

The Kruskal–Wallis tests indicates a significant relationship between the FM strategy applied by housing cooperatives and the size of the developer’s company and the contractor’s company. The cooperatives built by a large developer (or contractor) are more inclined to outsource FM to one company. However, the pairwise comparison test (Benjamini-Hochberg) did not confirm a statistically significant difference between groups.

Outsourcing facility management services

The results indicate that cooperative board members perceive *recommendations made by friends or colleagues* as the most credible source of information (Table III). Hence, the assessment of FM performance, made by board members themselves (*earlier experience*) or by a (trusted) property owner/cooperative, is named as the main input in the selection of FM services supplier.

Developer endorsements are used sporadically (Table III). It is unclear whether developers give their guidance or recommendations occasionally or whether the cooperatives choose to consider developers’ suggestions sparingly. The analysis indicates a significant difference in how cooperatives perceive *recommendations from developers* depending on developers and contractor’s size and FM (Table IV). This could confirm that cooperatives built by a large developer/constructor are likely to be part of an organisation

	FM strategy	(%)
Table I. Housing cooperatives choice of FM strategy	Outsourced FM-one external provider	23
	Outsourced to a number of external providers	57
	Special services outsourced, majority in-house	16
	In-house FM (internal provider)	4

	Geographical location	No. of dwelling	Total living area	No. of buildings	Developer’s size	Contractors’ size	Construction year
Table II. FM strategy; Kruskal–Wallis tests	FM strategy	0.000	0.000	0.031	0.016	0.001	0.379

with a vertical integration structure (Bröchner, 2008; Hans Lind, 2017). It is very likely that the FM services are offered by sister companies or entities within the organisation, and therefore, most likely included in the offer at the point of sale of the apartments.

In the area of digital presence and information, the on-line search and information from blogs and forums are underutilized, as only one-fifth of all the respondents rely on an *internet search* (Table III).

The analysis shows that the board members' statements regarding search differ significantly ($p > 0.05$, Table IV) in regard to cooperative size and developer/contractor size. The results suggest that large cooperatives, with number of dwellings exceeding 60, are more likely to use internet search in the process of FM selection than other cooperatives. The statistical significance was confirmed by a pairwise comparison test (Benjamini-Hochberg).

The cooperative board members value their own experience and recommendations from other cooperatives more with the increase in total living area (majority of large cooperatives answered that they often use own experience and recommendations as main factor in decision making, whereas smaller cooperatives used this source less often, difference in opinion being statistically significant, Table IV). The reason might be that the members of larger cooperatives are more likely to be more experienced, being earlier a member of a board of cooperatives or having professional experience in the property industry.

	Often (%)	Sometimes (%)	Never (%)	Mean
Recommendations from colleagues, friends, other cooperatives	42	49	9	2.33
Earlier experience (cooperative)	42	41	17	2.24
Internet search	19	48	33	1.86
Recommendations from developer	19	44	37	1.82
Information from blogs and forums	5	20	75	1.29
Consulting company (assignment)	0	8	92	1.09

Note: Values assigned to responses: 1 = never; 2 = sometimes; 3 = often

Table III. Preferred approach in searching for an FM company

	Geographical location	No. of dwellings	Total living area	No. of buildings	Developer's size	Contractors' size	Construction year
Recommendations from colleagues, friends, other cooperatives	0.732	0.001	0.000	0.032	0.064	0.086	0.246
Earlier experience (cooperative)	0.525	0.105	0.003	0.002	0.633	0.006	0.787
Internet search	0.646	0.015	0.061	0.880	0.104	0.777	0.098
Recommendations from developer	0.063	0.390	0.120	0.155	0.035	0.014	0.096
Information from blogs and forums	0.565	0.828	0.056	0.929	0.159	0.670	0.510
Consulting company (assignment)	0.160	0.605	0.612	0.300	0.004	0.120	0.080

Table IV. Preferred approach in searching for an FM company, Kruskal-Wallis tests

The factor that cooperatives perceive as most important in choosing FM is the competence of the companies' employees. This factor was found to be more important than the price (Table V; competence mean value being 3.26 and price 3.24, respectively), followed by contractual conditions and recommendations from other clients.

A computed Kruskal–Wallis test indicates no significant difference in ranking of factors depending on cooperative size, geographical location or construction year, except for the factor reflecting FM company expertise (*employees' competence*), the difference being statistically significant at the $p < 0.05$ level (Table VI). Pairwise comparison tests suggest a very weak significance level for difference in ranking of factors depending on cooperative size (measured by number of dwellings).

Satisfaction with facility management

PM can be separated into various services such as security, technical operation and repair, indoor and outdoor cleaning and maintenance (Lai, 2011) and general management, which can include accounting, tax and legal services. Execution of operational and maintenance services can be assessed by occupants as the outputs are evident to the user; however,

Table V.
Rating for importance of factors when searching and choosing an FM company

	Decisive (%)	Important (%)	Not really important (%)	Unimportant (%)	Mean
Employees' competence (e.g. education, certifications)	40	48	9	2	3.26
Price	32	62	4	1	3.24
Contractual conditions (other than time and price)	24	62	12	2	3.07
Other client/customer comments and recommendations	23	53	19	4	2.96
Contract time frame	9	64	21	6	2.75
Information on companies' websites	3	29	53	15	2.20

Table VI.
Difference in factors when searching and choosing an FM company, Kruskal–Wallis tests

	Geographical location	No. of dwellings	Total living area	No. of buildings	Developer's size	Contractors' size	Construction year
Employees' competence (e.g. education, certifications)	0.704	0.034	0.210	0.809	0.667	0.299	0.104
Price	0.291	0.250	0.751	0.605	0.578	0.991	0.839
Contractual conditions (other than time and price)	0.579	0.115	0.273	0.753	0.982	0.943	0.876
Other client/customer comments and recommendations	0.905	0.435	0.466	0.120	0.900	0.942	0.926
Contract time frame	0.503	0.349	0.373	0.935	0.174	0.227	0.309
Information on companies' websites	0.367	0.008	0.474	0.888	0.997	0.131	0.574

certain general management services, such as bookkeeping and legal support, are observable mostly by the cooperative board.

Housing cooperatives show relatively high satisfaction with FM services (Table VII): bookkeeping services, which may include accounting, financial reporting and tax returns, were ranked highest and technical services, which may include maintenance, heating ventilating and air conditioning (HVAC) operation, repairs, scored the lowest points.

The Kruskal–Wallis test analysis indicates that there is no significant difference in satisfaction with FM services depending on cooperative size, construction year and geographical location, except satisfaction with technical services.

Housing cooperatives' satisfaction with technical services was scored significantly lower in big and medium-sized cities (including suburban municipalities) than in sparsely populated municipalities ($p = 0.048$ for Kruskal–Wallis test with tiles). Pairwise comparison confirms statistical significance between those groups.

The potential explanation may be that the cooperatives located in sparsely populated municipalities mainly out-task specific jobs to a local company. It is most likely that the services procured in big and medium-sized cities are more formal, limited to contracted tasks and with relatively limited personal engagement.

Building quality and facility management services

The defects reported by cooperative board members include building envelope/airtightness (windows, balcony); drainage and plumbing; installations HVAC; finish and appliances. The mean value for the perceived building quality index, created as a row average for all the reported defects in the building, is 1.65, with a standard deviation of 0.34. The index applies the following scale: for value “1” – no problem has been reported, for value “2” – minor problems reported, “3” – severe problems reported.

The hypothesis ($H1$) that the cooperative strategy for outsourcing FM services has a significant effect on perception of building quality has been tested. The analysis revealed a significant relationship between outsourcing strategy and the perception of building quality (Table VIII), meaning that we can reject a null hypothesis of equality of means. The cooperatives, which stated that they procured one company to provide all the FM services indicated a significantly higher number of defects (mean value 1.71) than the cooperatives, which out-task only specific jobs (mean value 1.49) and the cooperatives that perform the services themselves (in-house, mean value 1.37).

No significant relationship has been found between reported defects and the satisfaction of housing cooperative boards with technical, outdoor or bookkeeping services. The analysis indicates that a null hypothesis ($H2$) of equality of means cannot be rejected. However, the results show a significant relationship between reported defects and satisfaction with indoor services (Table IX). The analysis indicates that the cooperatives, which perceive indoor services, which may include minor repairs and cleaning, as very satisfactory, report fewer

Satisfaction with property management/facility services	Very satisfied (%)	Relatively satisfied (%)	Dissatisfied (%)	Mean
Bookkeeping services (ex. financial reporting, taxes)	67	31	2	2.64
Outdoor services (ex. landscape, snow removal)	45	45	10	2.35
Indoor services (ex. minor repairs, cleaning)	43	50	7	2.36
Technical services (ex. maintenance, operation, repairs)	42	49	9	2.33

Table VII.
Satisfaction with
facilities
management services

defects. Therefore, the hypothesis (*H2*) that satisfaction with FM services affects perception of building quality can only partly be confirmed.

Discussion

In this paper, we examine the strategies of housing cooperatives for facilities management arrangements (in-house/outsourcing) and investigate cooperatives' choice of and satisfaction with facility services. The findings suggest that the majority of cooperatives choose to outsource limited responsibilities to FM providers in the form of tasks rather than transferring management and decision making authority. In this way, the owners retain full decision control but are also responsible for co-ordinating efforts and resources, especially if the cooperative chooses to out-task to many companies specializing in one particular field, for instance, ventilation services/maintenance, heating services/maintenance, drainage system maintenance, elevator services or fire and safety audit. In such a case, cooperatives withhold management and decision control but also bear the responsible for overseeing and coordinating service providers in maintaining building quality. The responsibility and the personal engagement might explain the results confirming our hypothesis (*H1*), that cooperatives' perception of building quality is affected by the degree of control retained by owners.

The results suggest that FM strategy depends on cooperative size; smaller cooperatives are more likely to keep services in-house and with increasing size, the cooperatives tend to move towards outsourcing the services to a few companies or even to one general management company. These findings are in line with earlier studies conducted in Hong Kong and Taipei (Yip *et al.*, 2007), which conclude that the owners' choice of FM strategy reflects an opportunity cost for degree of control that owners are willing to waive for the disposition of complex management tasks.

Table VIII.
The relationship between total reported defects (perceived building quality) and FM strategy

Reported defects and housing cooperative FM strategy	
ANOVA <i>R</i> ²	0.0677
<i>p</i> (probability)	0.0000
<i>n</i>	371
<i>Mean values of reported defects as per group</i>	
Outsourced FM – one external provider	1.71
Outsourced to a number of external providers	1.68
Special services outsourced, majority in-house	1.49
In-house FM (internal provider)	1.37

Table IX.
The relationship between total reported defects (perceived building quality) and satisfaction with FM services

Reported defects and satisfaction with indoor services (ex. minor repairs, cleaning)	
ANOVA <i>R</i> square	0.0263
<i>p</i> (probability model)	0.0147
<i>n</i>	245
<i>Mean values of reported defects as per group</i>	
Dissatisfied	1.68
Relatively satisfied	1.74
Very satisfied	1.61

Cooperative board members perceive recommendations made by friends or colleagues as the most credible source of information. Hence, the assessment of FM performance, made by board members themselves or by (trusted) property owners/cooperatives, is named as the main input in the selection of a FM services supplier. Recommendations are a rational approach to source information about companies that are proven to be trustworthy and offer expertise, safety and security. (James and Carswell, 2008; Hui and Zheng, 2010; Levy and Sim, 2014; Sia *et al.*, 2018).

However, the fact that cooperatives rely mainly on experience (either their own or that of a third party) might cause certain problems as well such as information bias. Researchers have recognised that the decision process includes constructing a preference, which means that the alternative choice that has emerged (for example, a recommendation or own experience) creates a leading preference, meaning that information gained after the preference has been established generally aims to confirm the preferred choice or to disapprove other alternatives (Chaxel *et al.*, 2013). The problem relates to the underpinnings of the recommendation. The recommendation is based on memory of the service, the experience of or reconstructed satisfaction with, the service; it does not take into consideration the contract conditions or specific technical knowledge needed to provide the FM services.

This study indicates that only one-fifth of all the respondents rely on internet search, information from blogs and forums and information published on company websites. The ranking of factors affecting choice of FM suggests that information found on websites to be least valuable. This is very interesting and suggests a lack of trust and a rather sceptical approach towards information published online. In fact, at present there is no local accreditation system in place for property/facility managers in Sweden. This may explain why customers heavily rely on their own experience and recommendations from other cooperatives/friends. The analysis of FM websites is outside the scope of this research; we hope that future study will bring more knowledge on this subject.

The factor that cooperatives perceive as most important in choosing FM is the competence of the companies' employees. This factor was found to be more important than the price and contractual conditions, which may lead to a gap between expectations and delivery, as it is the contract that shapes the deliverables (Palm, 2018).

Concluding remarks

This study empirically validated the relationship between FM strategy and the perception of building quality, raising a number of questions, which we hope future studies can provide an answer to. An interesting question to investigate is why the FM strategy, outsourcing and in-house, affects the perception of building quality. Is the difference in total reported defects prompted by the contracted FM company because the defects affect the execution of the contracted FM task or due to extra assignment possibilities and charges that may be imposed? It is also possible that the FM company has better legal and technical knowledge, enabling them to recognise issues, which fall under the developers' guarantees, signalling to the housing owners that repair and related costs may fall under guarantee.

The presented results are based on subjective opinions expressed by cooperative owners. It would be valuable to expand the data set and include additional data about building quality, for example, information about the building fabric, energy performance or inspection reports. Unfortunately, we were not able to collect and include data from on-site measurements or guarantee inspection reports. The intention was to include energy performance certification data in the study; however, we were not able to match all the responses and compose a satisfactory data set. We hope that future studies will be able to

explore possibilities to consolidate different data sets and provide more insights into the relationship between building quality and FM strategies.

The survey questionnaire was sent to cooperatives boards with the aim of collecting information on cooperatives FM strategy and perceived building quality. It is common that a cooperative board in Sweden include 4-6 members, often appointed for a 2-3 year period. Competence base, education and experience with property management may vary between board members and may vary in time. It is possible that a recorded survey response might be the view of one person or a joint statement made by board members. Therefore, it is assumed that a respondent in the survey is a cooperative board, rather than an individual. It is advised that future studies focus on the composition of cooperatives, investigating the potential effect of demographic factors on boards' decision making and management strategies.

This study contributes to the body of knowledge on housing property and facilities management and adds to previous research on the concept of building quality by advancing understanding of FM services in relation to building quality assessment. The study results highlight a need for transparency and objective way of signalling quality and competence of FM services. Considering climate change challenges and technological advances it is crucial that real estate owners can make an informed decision while selecting FM services to achieve efficient use of resources though building live cycle. The presented study adds to body of knowledge on property management in cooperatives, and join previous researchers' call (Anund Vogel *et al.*, 2016; Palm, 2015) for more research in the area.

The presented study explores general strategies among cooperatives and the results represent the FM approach of the cooperatives valid at the time of the survey. A study of evolution and/or changes in FM strategies over time could contribute further to the knowledge on property management in residential buildings.

References

- Akerlof, G.A. (1970), "The market for 'lemons': quality under uncertainty and the market mechanism", *The Quarterly Journal of Economics*, Vol. 84 No. 3, pp. 488-500.
- Andersen, P.D., Andersen, A.D., Jensen, P.A. and Rasmussen, B. (2014), "Sectoral innovation system foresight in practice: Nordic facilities management foresight", *Futures*, Vol. 61, pp. 33-44.
- Anund Vogel, J., Lind, H. and Lundqvist, P. (2016), "Who is governing the commons: studying Swedish housing cooperatives", *Housing, Theory and Society*, Vol. 33 No. 4, pp. 424-444.
- Auchterlounie, T. (2009), "Recurring quality issues in the UK private house building industry", *Structural Survey*, Vol. 27 No. 3, pp. 241-251.
- Baines, P., Fill, C. and Rosengren, S. (2017), *Marketing*, 4th ed., Oxford University Press, New York, NY.
- Barrett, P. (2000), "Systems and relationships for construction quality", *International Journal of Quality and Reliability Management*, Vol. 17 Nos 4/5, pp. 377-392.
- Benjamin, J.D., Chinloy, P. and Hardin, W.G. (2006), "Local presence, scale and vertical integration: brands as signals", *The Journal of Real Estate Finance and Economics*, Vol. 33 No. 4, pp. 389-403.
- Bickart, B. and Schindler, R.M. (2001), "Internet forums as influential sources of consumer information", *Journal of Interactive Marketing*, Vol. 15 No. 3, pp. 31-40.
- Bröchner, J. (2008), "Construction contractors integrating into facilities management", *Facilities*, Vol. 26 Nos 1/2, pp. 6-15.
- Carswell, A. (2017), "An analysis of operating expense control within US multifamily properties", *Property Management*, Vol. 35 No. 1, pp. 48-66.

- Carswell, A. (2018), "Living where you work: Determining the value-added nature of the on-site residential property manager", *Facilities*, Vol. 36 Nos 5/6, pp. 258-271.
- CEN (2006), *EN 15221-1: 2006 Facility Management – Part 1: Terms and Definitions*, CEN (European Committee for Standardization), Brussels.
- Chang, T.Y. and Horng, S.C. (2010), "Conceptualizing and measuring experience quality: the customer's perspective", *The Service Industries Journal*, Vol. 30 No. 14, pp. 2401-2419.
- Chaxel, A.S., Russo, J.E. and Kerimi, N. (2013), "Preference-driven biases in decision makers' information search and evaluation", *Judgment and Decision Making*, Vol. 8 No. 5, pp. 561-576.
- Chong, W.K. and Low, S.P. (2006), "Latent building defects: causes and design strategies to prevent them", *Journal of Performance of Constructed Facilities*, Vol. 20 No. 3, pp. 213-221.
- Christiansen, O. (2011), "Rethinking quality by classic grounded theory", *International Journal of Quality and Service Sciences*, Vol. 3 No. 2, pp. 199-210.
- Christudason, A. (2008), "Choice of property management system for residential strata developments in Singapore", *Property Management*, Vol. 26 No. 2, pp. 97-111.
- Cramer, A.O., van Ravenzwaaij, D., Matzke, D., Steingroever, H., Wetzels, R., Grasman, R.P., Waldrop, L.J. and Wagenmakers, E.J. (2016), "Hidden multiplicity in exploratory multiway ANOVA: Prevalence and remedies", *Psychonomic Bulletin and Review*, Vol. 23 No. 2, pp. 640-647.
- Damodaran, A., John, K. and Liu, C.H. (1997), "The determinants of organizational form changes: Evidence and implications from real estate", *Journal of Financial Economics*, Vol. 21 No. 2, pp. 169-192.
- Doney, P.M. and Cannon, J.P. (1997), "An examination of the nature of trust in buyer-seller relationships", *Journal of Marketing*, Vol. 61 No. 2, pp. 35-51.
- Eisenbeiss, M., Cornelissen, M., Backhaus, K. and Hoyer, W.D. (2014), "Nonlinear and asymmetric returns on customer satisfaction: do they vary across situations and consumers?", *Journal of the Academy of Marketing Science*, Vol. 42 No. 3, pp. 242-263.
- Elmualim, A., Shockley, D., Valle, R., Ludlow, G. and Shah, S. (2010), "Barriers and commitment of facilities management profession to the sustainability agenda", *Building and Environment*, Vol. 45 No. 1, pp. 58-64.
- Fauzi, S.N.F.M. and Abidin, N.Z. (2012), "The relationship of housing defects, occupants' satisfaction and loyalty behavior in build-then-sell houses", *Procedia – Social and Behavioral Sciences*, Vol. 62, pp. 75-86.
- Forcada, N., Macarulla, M. and Love, P.E. (2012), "Assessment of residential defects at post-handover", *Journal of Construction Engineering and Management*, Vol. 139 No. 4, pp. 372-378.
- Forcada, N., Macarulla, M., Gangoells, M. and Casals, M. (2016), "Handover defects: comparison of construction and post-handover housing defects", *Building Research and Information*, Vol. 44 No. 3, pp. 279-288.
- Forsythe, P. (2006), "Consumer-perceived appearance tolerances in construction quality management", *Engineering, Construction and Architectural Management*, Vol. 13 No. 3, pp. 307-318.
- Forsythe, P. (2008), "Modelling customer perceived service quality in housing construction engineering", *Engineering, Construction and Architectural Management*, Vol. 15 No. 5, pp. 485-496.
- Gao, W. (2015), "Collective actions for the management of multi-owned residential building: a case of Hong Kong", *Habitat International*, Vol. 49, pp. 316-324.
- Glöckner, A. and Bröder, A. (2011), "Processing of recognition information and additional cues: a model-based analysis of choice, confidence, and response time", *Judgment and Decision Making*, Vol. 6 No. 1, p. 23.
- Guiding, C., Lamminmaki, D. and Warnken, J. (2015), "Preparing strata titled communities for climate change: an empirical examination", *Property Management*, Vol. 33 No. 4, pp. 308-329.

- Ho, D.C. and Gao, W. (2013), "Collective action in apartment building management in Hong Kong", *Habitat International*, Vol. 38, pp. 10-17.
- Ho, C.D. and Liusman, E. (2016), "Measuring the performance of property management companies in high-rise flats", *Facilities*, Vol. 34 Nos 3/4, pp. 161-176.
- Ho, C.T. and Wei, C.L. (2016), "Effects of outsourced service providers' experiences on perceived service quality: a signaling theory framework", *Industrial Management and Data Systems*, Vol. 116 No. 8, pp. 1656-1677.
- Holt, R. and Rowe, D. (2000), "Total quality, public management and critical leadership in civil construction projects", *International Journal of Quality and Reliability Management*, Vol. 17 Nos 4/5, pp. 541-553.
- Hui, E.C. and Zheng, X. (2010), "Measuring customer satisfaction of FM service in housing sector", *Facilities*, Vol. 28 Nos 5/6, pp. 306-320.
- Hui, E.C., Ting Lau, H. and Hayat Khan, T. (2011), "Effect of property management on property price: a case study in HK", *Facilities*, Vol. 29 Nos 11/12, pp. 459-471.
- Hui, E.C., Yu, K.H. and Tse, C.K. (2016), "The impact of environmental management awards and certifications in property management on property price", *Facilities*, Vol. 34 Nos 5/6, pp. 314-338.
- Ikediashi, D.I., Ogunlana, S.O., Boateng, P. and Okwuashi, O. (2012), "Analysis of risks associated with facilities management outsourcing: a multivariate approach", *Journal of Facilities Management*, Vol. 10 No. 4, pp. 301-316.
- James, I.I.R.N. and Carswell, A. (2008), "Home sweet apartment: a text analysis of satisfaction and dissatisfaction with apartment homes", *Housing and Society*, Vol. 35 No. 1, pp. 91-111.
- Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.
- Jha, S., Deitz, G.D., Babakus, E. and Yavas, U. (2013), "The role of corporate image for quality in the formation of attitudinal service loyalty", *Journal of Service Research*, Vol. 16 No. 2, pp. 155-170.
- Kahneman, D. and Tversky, A. (1979), "Prospect theory: an analysis of decision under risk", *Econometrics*, Vol. 47 No. 2, p. 263.
- Katzler, S., Berggren, B. and Gustafsson, C. (2017), "Will outsourcing of commercial property management functions add to performance? A quantitative analysis of the Swedish market", Working Paper, Department of Real Estate Economics and Construction Management, available at: www.diva-portal.org/smash/get/diva2:1095009/FULLTEXT01.pdf
- Kim, H. and Choi, B. (2013), "The influence of customer experience quality on customers' behavioral intentions", *Services Marketing Quarterly*, Vol. 34 No. 4, pp. 322-338.
- Kimble, L.B. and Rutherford, R.C. (1993), "Corporate real estate outsourcing: a survey of the issues", *Journal of Real Estate Research*, Vol. 8 No. 4, pp. 525-540.
- Knight, J.R. and Sirmans, C.F. (1996), "Depreciation, maintenance, and housing prices", *Journal of Housing Economics*, Vol. 5 No. 4, pp. 369-389.
- Kurdia, M.K., Abdul-Tharim, A.H., Jaffar, N., Azli, M.S., Shuib, M.N. and Ab-Wahid, A.M. (2011), "Outsourcing in facilities management-A literature review", *Procedia Engineering*, Vol. 20, pp. 445-457.
- Lai, J.H. and Yik, F.W. (2006), "Knowledge and perception of operation and maintenance practitioners in Hong Kong about sustainable buildings", *Facilities*, Vol. 24 Nos 3/4, pp. 90-105.
- Lai, H.K. (2011), "Comparative evaluation of facility management services for housing estates", *Habitat International*, Vol. 35 No. 2, pp. 391-397.
- Lai, H.K. (2014), "Influence of personal attributes on perception of residential facilities management services", *Facilities*, Vol. 32 Nos 9/10, pp. 509-521.

- Lam, T.Y. (2008), "Procuring professional housing maintenance services", *Facilities*, Vol. 26 Nos 1/2, pp. 33-53.
- Lam, T.Y. (2011), "Outsourcing of housing services in Hong Kong: optimization of transaction value", *Journal of Facilities Management*, Vol. 9 No. 2, pp. 114-126.
- Lam, T.Y. (2012), "Economic perspective on outsourcing of property management services", *Property Management*, Vol. 30 No. 4, pp. 318-332.
- Levy, D. and Sim, Q.H. (2014), "Why multi-owned housing owners are dissatisfied with the service provided by their management companies in New Zealand", *International Journal of Housing Markets and Analysis*, Vol. 7 No. 3, pp. 397-416.
- Li, J. and Monkkonen, P. (2014), "The value of property management services: an experiment", *Property Management*, Vol. 32 No. 3, pp. 213-223.
- Lind, H. (2017), "Vertical integration in the real estate sector: three Swedish case studies", *Journal of European Real Estate Research*, Vol. 10 No. 2, pp. 195-210.
- McKnight, D.H., Choudhury, V. and Kacmar, C. (2002), "Developing and validating trust measures for e-commerce: an integrative typology", *Information Systems Research*, Vol. 13 No. 3, pp. 334-359.
- Malpezzi, S., Ozanne, L. and Thibodeau, T.G. (1987), "Microeconomic estimates of housing depreciation", *Land Economics*, Vol. 63 No. 4, pp. 371-372.
- Matsham, A. and Heywood, C. (2012), "An investigation of corporate real estate management outsourcing in Melbourne", Paper Presented at The 18th Annual Pacific-Rim real Estate Society Conference, Adelaide.
- Milion, R.N., Alves, T.D.C. and Paliari, J.C. (2017), "Impacts of residential construction defects on customer satisfaction", *International Journal of Building Pathology and Adaptation*, Vol. 35 No. 3, pp. 218-232.
- Mills, A., Love, P.E. and Williams, P. (2009), "Defect costs in residential construction", *Journal of Construction Engineering and Management*, Vol. 135 No. 1, pp. 12-16.
- Mohr-Jackson, I. (1998), "Conceptualizing total quality orientation", *European Journal of Marketing*, Vol. 32 Nos 1/2, pp. 13-22.
- Ooi, J.T., Le, T.T. and Lee, N.J. (2014), "The impact of construction quality on house prices", *Journal of Housing Economics*, Vol. 26, pp. 126-138.
- Palm, P. (2015), "Challenges of commercial real estate management", Doctoral Dissertation, The Royal Institute of Technology, Stockholm.
- Palm, P. (2018), "Outsourced property management: the regulations of the property manager", *Property Management*, Vol. 36 No. 5, pp. 620-632.
- Pan, W. and Thomas, R. (2014), "Defects and their influencing factors of posthandover new-build homes", *Journal of Performance of Constructed Facilities*, Vol. 29 No. 4, p. 4014119.
- Rotimi, F.E., Tookey, J. and Rotimi, J.O. (2015), "Evaluating defect reporting in new residential buildings in New Zealand", *Buildings*, Vol. 5 No. 1, pp. 39-55.
- Roulac, S.E. (2007), "Brand + beauty + utility = property value", *Property Management*, Vol. 25 No. 5, pp. 428-446.
- Sheskin, D.J. (2000), *Parametric and Nonparametric Statistical Procedures*, Chapman and Hall/CRC, Boca Raton, FL.
- Sia, M.K., Yew, V.W.C., Lim, Z.Y. and Dongqing, Y. (2018), "Facilities and maintenance services for sustainable high-rise living", *Facilities*, Vol. 36 Nos 7/8, pp. 330-348.
- Sommerville, J. and McCosh, J. (2006), "Defects in new homes: an analysis of data on 1,696 new UK houses", *Structural Survey*, Vol. 24 No. 1, pp. 6-21.
- Thissen, D., Steinberg, L. and Kuang, D. (2002), "Quick and easy implementation of the Benjamini-Hochberg procedure for controlling the false positive rate in multiple comparisons", *Journal of Educational and Behavioral Statistics*, Vol. 27 No. 1, pp. 77-83.

- Tuttle, B. (2012), "Why you shouldn't trust positive online reviews – or negative ones, for that matter", Time, available at: www.nytimes.com/2018/06/13/smarter-living/trust-negative-product-reviews.html (accessed 15 February 2019).
- Völckner, F. and Hofmann, J. (2007), "The price-perceived quality relationship: a meta-analytic review and assessment of its determinants", *Marketing Letters*, Vol. 18 No. 3, pp. 181-196.
- Walker, R.H. and Johnson, L.W. (2009), "Signaling intrinsic service quality and value via accreditation and certification", *Managing Service Quality: An International Journal*, Vol. 19 No. 1, pp. 85-105.
- Wells, J.D., Valacich, J.S. and Hess, T.J. (2011), "What signal are you sending? How website quality influences perceptions of product quality and purchase intentions", *MIS Quarterly*, Vol. 35 No. 2, pp. 373-396.
- Wilhelmsson, M. (2008), "House price depreciation rates and level of maintenance", *Journal of Housing Economics*, Vol. 17 No. 1, pp. 88-101.
- Yau, Y. (2011), "Homeowners' participation in management of multi-storey residential buildings: the Hong Kong's case", *Property Management*, Vol. 29 No. 4, pp. 345-356.
- Yau, Y. (2014), "Perceived efficacies and collectivism in multi-owned housing management", *Habitat International*, Vol. 43, pp. 133-141.
- Yip, N., Chang, C. and Hung, T. (2007), "Modes of condominium management: a principal-agent perspective", *Facilities*, Vol. 25 Nos 5/6, pp. 215-226.
- Yiu, C.Y., Wong, S.K. and Yau, Y. (2006), "Property management as property rights governance: exclusion and internal conflict resolution", *Property Management*, Vol. 24 No. 2, pp. 87-97.
- Zalejska-Jonsson, A. (2014), "Parameters contributing to occupants' satisfaction: Green and conventional residential buildings", *Facilities*, Vol. 32 Nos 7/8, pp. 411-437.
- (anonymised) reference anonymised due to double blind review.
- Zeithaml, V.A. (1988), "Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence", *Journal of Marketing*, Vol. 52 No. 3, pp. 2-22.

Further reading

- Johnsson, H. and Meiling, J. (2009), "Defects in offsite construction: Timber module prefabrication", *Construction Management and Economics*, Vol. 27 No. 7, pp. 667-681.
- SCB (2015), "Statistics Sweden, number of dwellings by type of building", available at: www.statistikdatabasen.scb.se/pxweb/sv/ssd/START_BO_BO0104/BO0104T04/table/tableViewLayout/?rid=0d5da7a9-66e1-4122-bd62-c4a19ba158ef (accessed 21 February 2017).
- Sui Pheng, L. and Wee, D. (2001), "Improving maintenance and reducing building defects through ISO 9000", *Journal of Quality in Maintenance Engineering*, Vol. 7 No. 1, pp. 6-24.

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